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AUTHORS: Kishkin, S. T.; Polyak, E. V.; Solonina, O. P.; Moiseyev, V. N.; Tarasenko, G. N.; Kurayeva, V. P.

ORG: none

TITLE: Structural transformations in titanium alloys

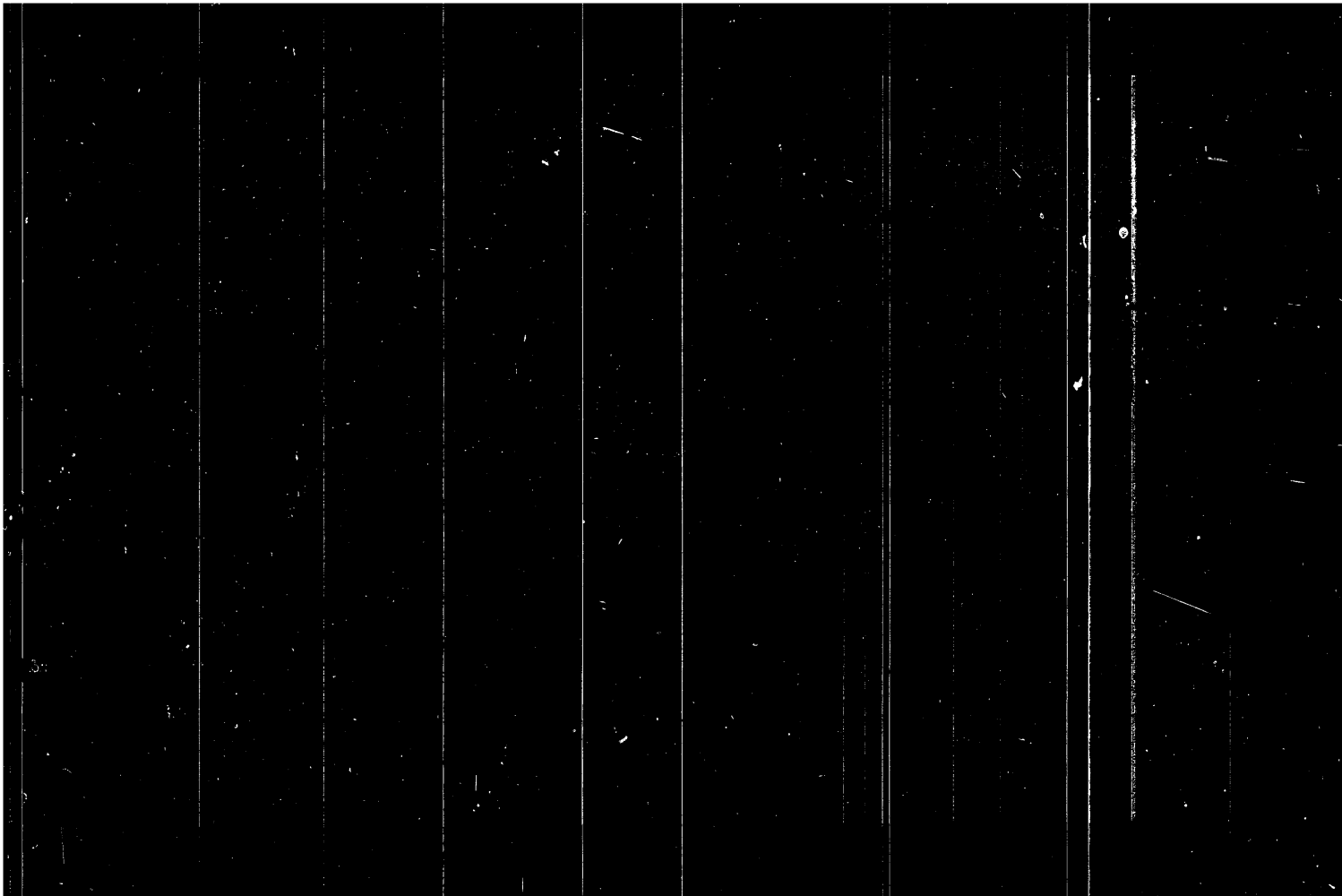
SOURCE: Soveshchaniye po metallokhimii, metallovedeniyu i primeneniyu titana i yego splavov, 6th. Novyye issledovaniya titanovykh splavov (New research on titanium alloys); trudy soveshchaniya, Moscow, Izd-vo Nauka, 1965, 82-88

TOPIC TAGS: annealing, phase composition, alloy, titanium, titanium alloy, electron microscopy/ VT3-1 alloy, VT14 alloy, VT16 alloy, VT15 alloy, VT10 alloy

ABSTRACT: The structural transformations induced by annealing in ($\alpha + \beta$) alloys of the types VT3-1, VT14, and VT16, in β alloy of VT15 and in α alloy of VT10, containing an intermetallic strengthening agent, were studied. The study was carried out by means of electron microscopy. Electron microscope photographs of specimens annealed at different temperatures are presented. Annealing alloys under different conditions leads to a phase transformation in the alloys. The optimum phase composition that possesses maximum strength and plasticity was found to consist of single α -phase regions and highly dispersed heterogeneous ($\alpha + \beta$) phase regions resulting from the decomposition of the metastable β -phase. Thermal stability of alloys may be increased by the addition of aluminum to the alloy. Orig. art. has: 2 figures.

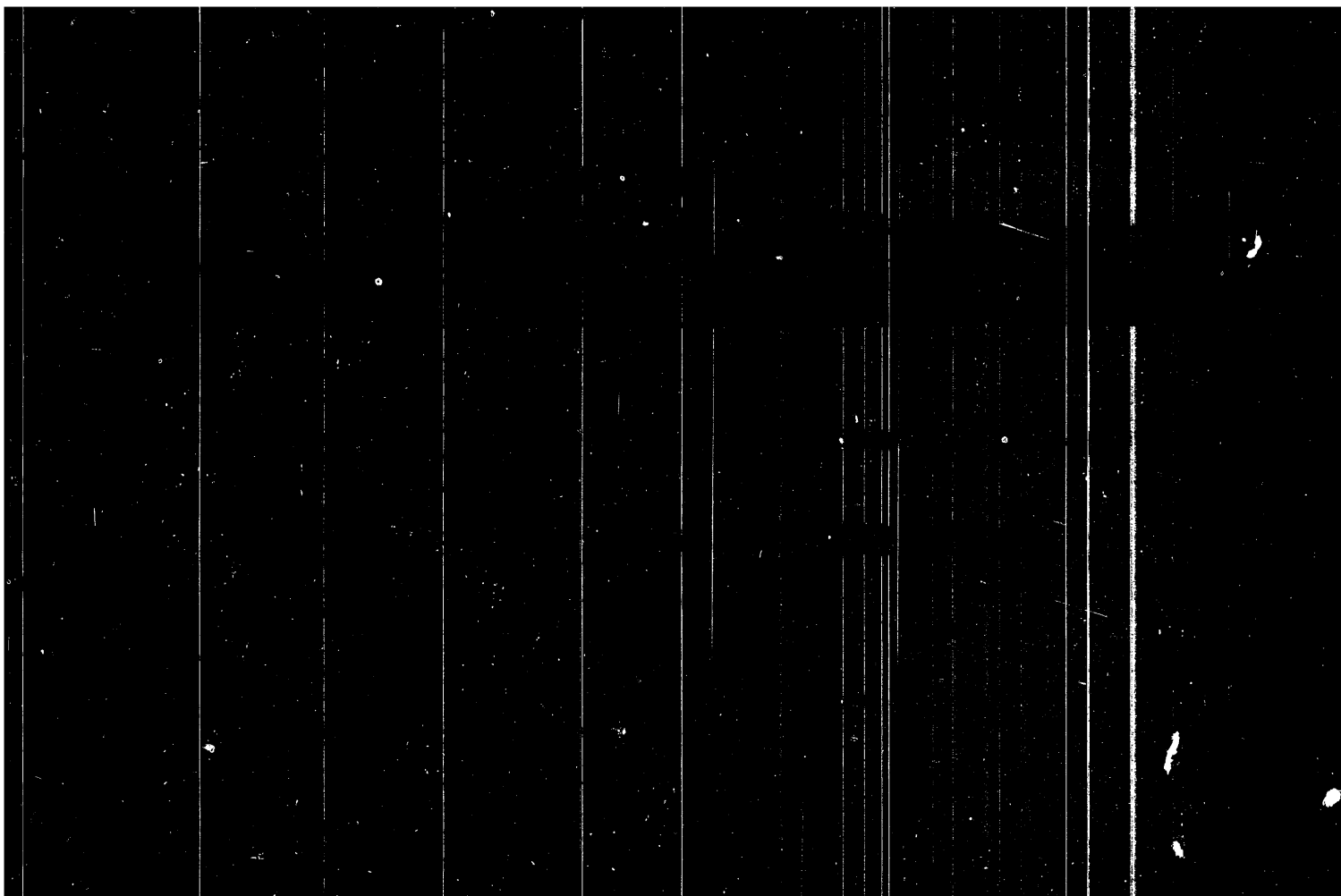
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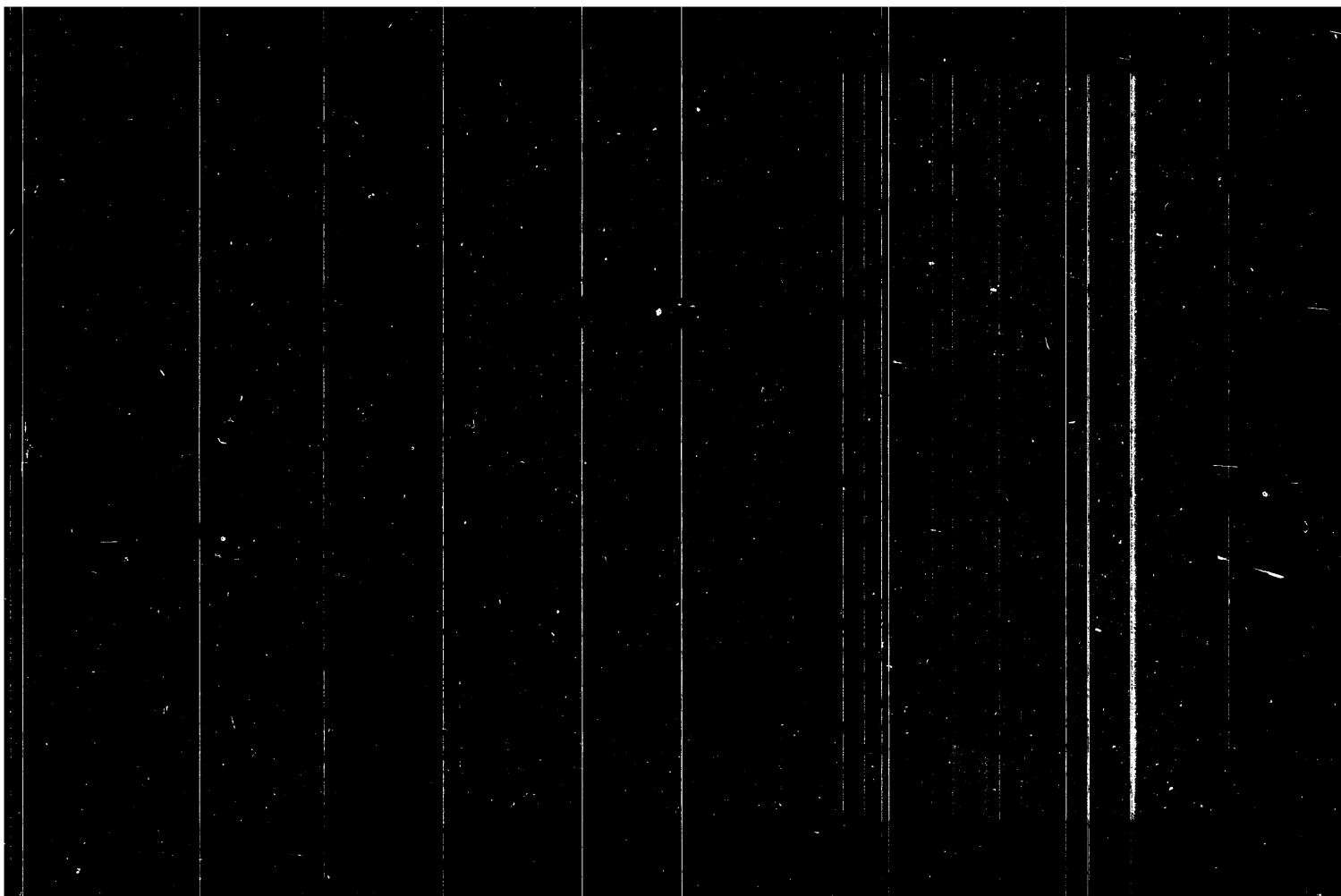
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KHOREV, A.I., inzh.; MOISEYEV, V.N., kand. tekhn. nauk;
KAZAKEVICH, I.I., kand. tekhn. nauk

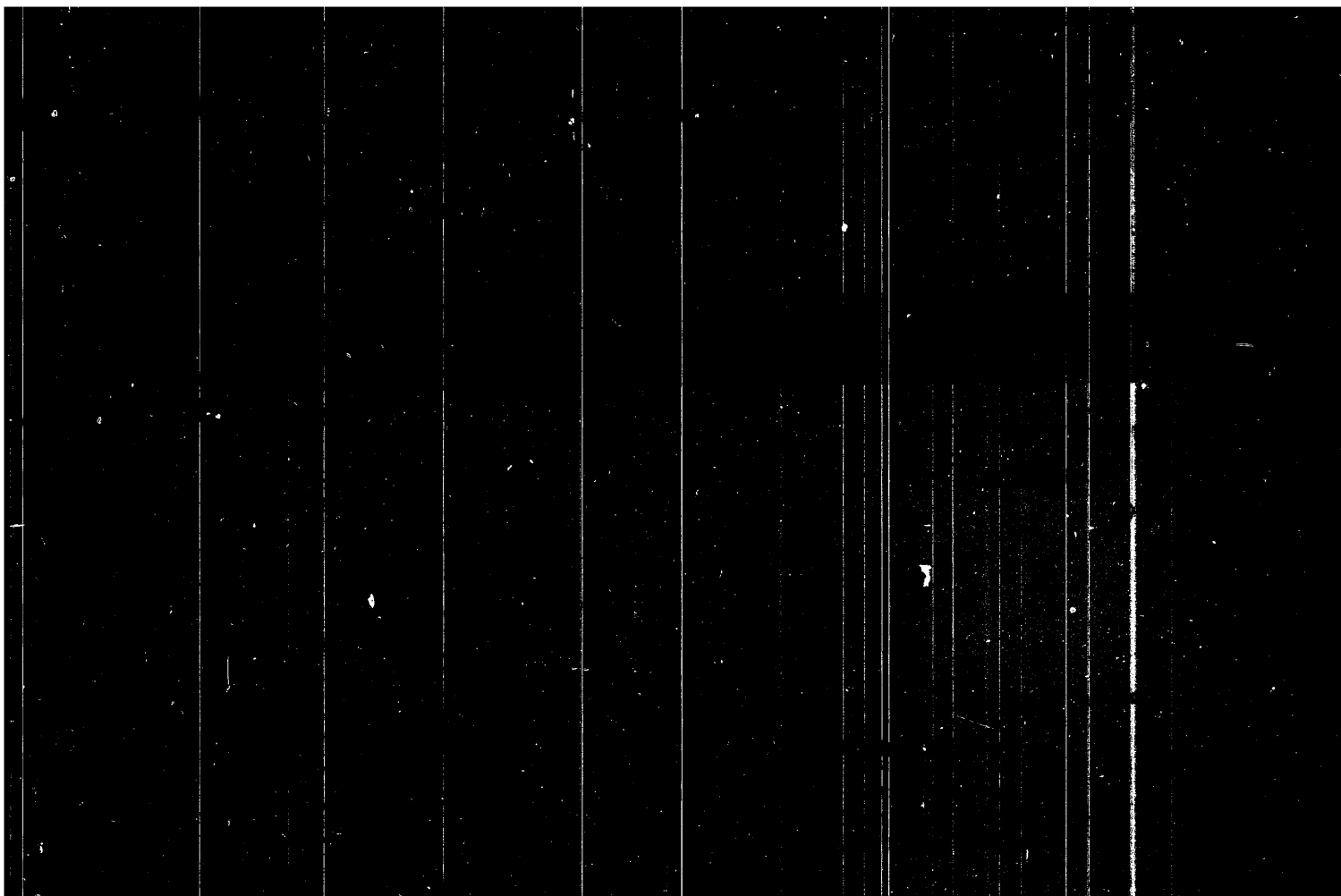
Use of BT14 titanium alloy in vessels. Vest. mashinostr. 44
no.5:35-37 My '64. (MIRA 17:6)

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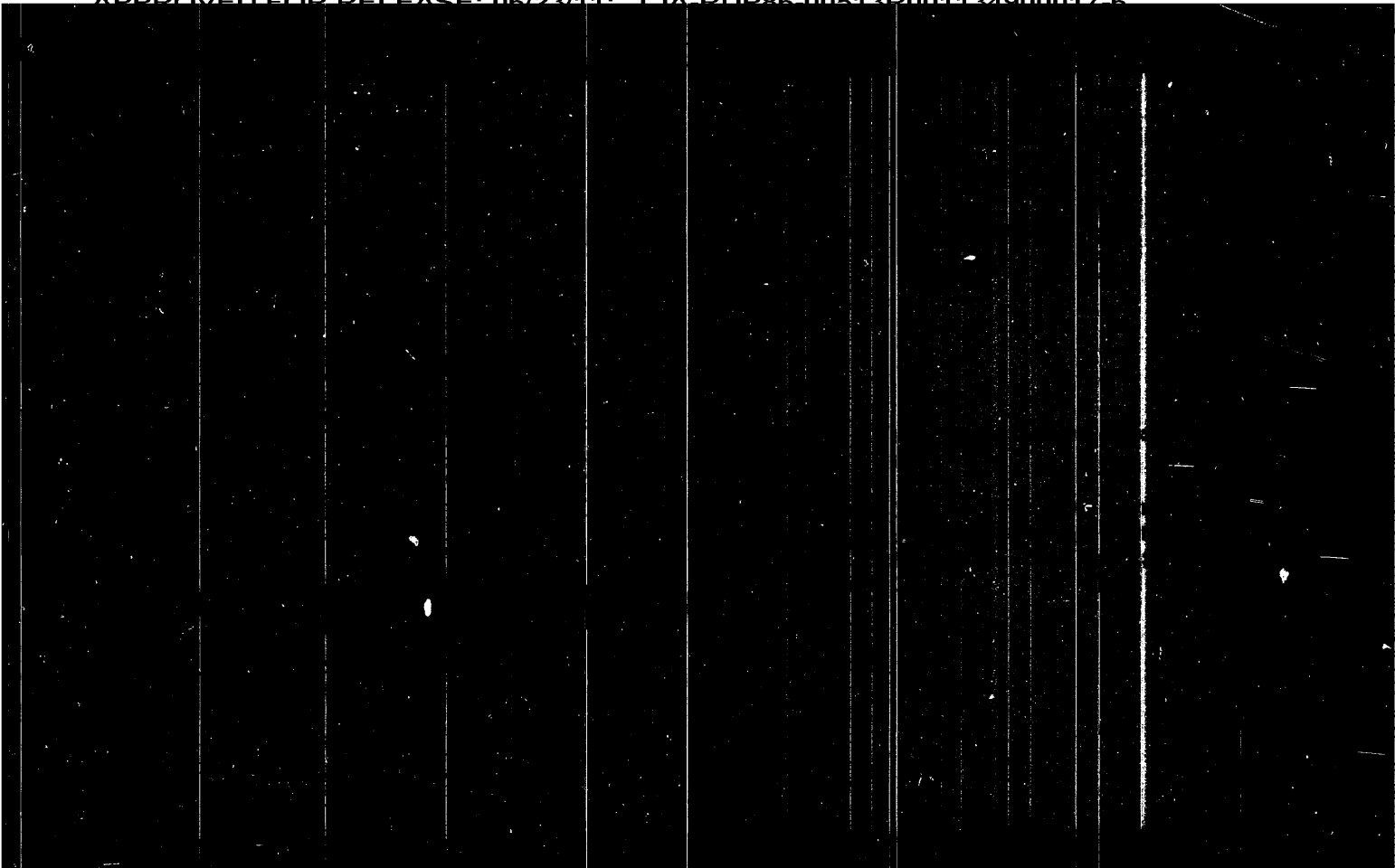
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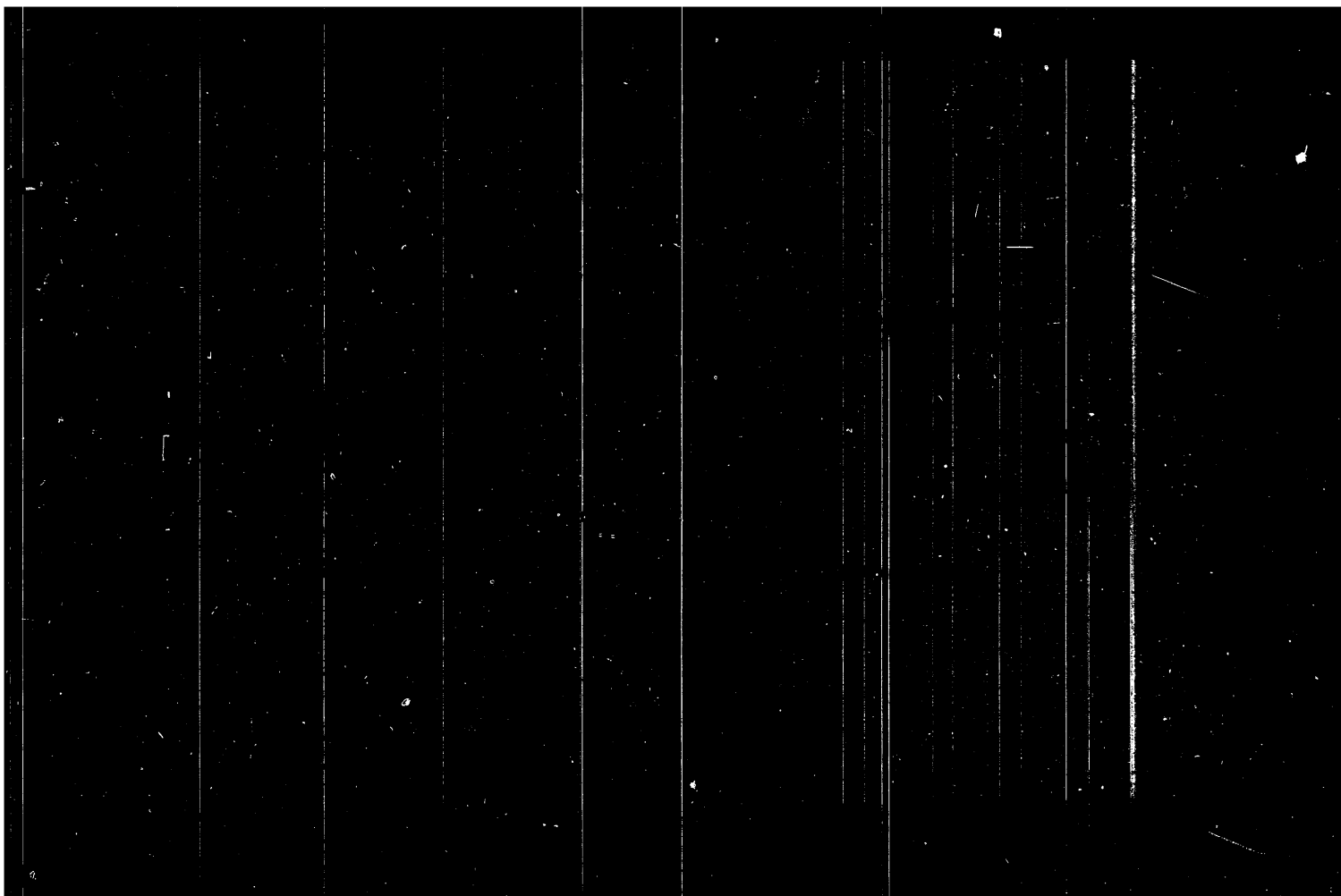


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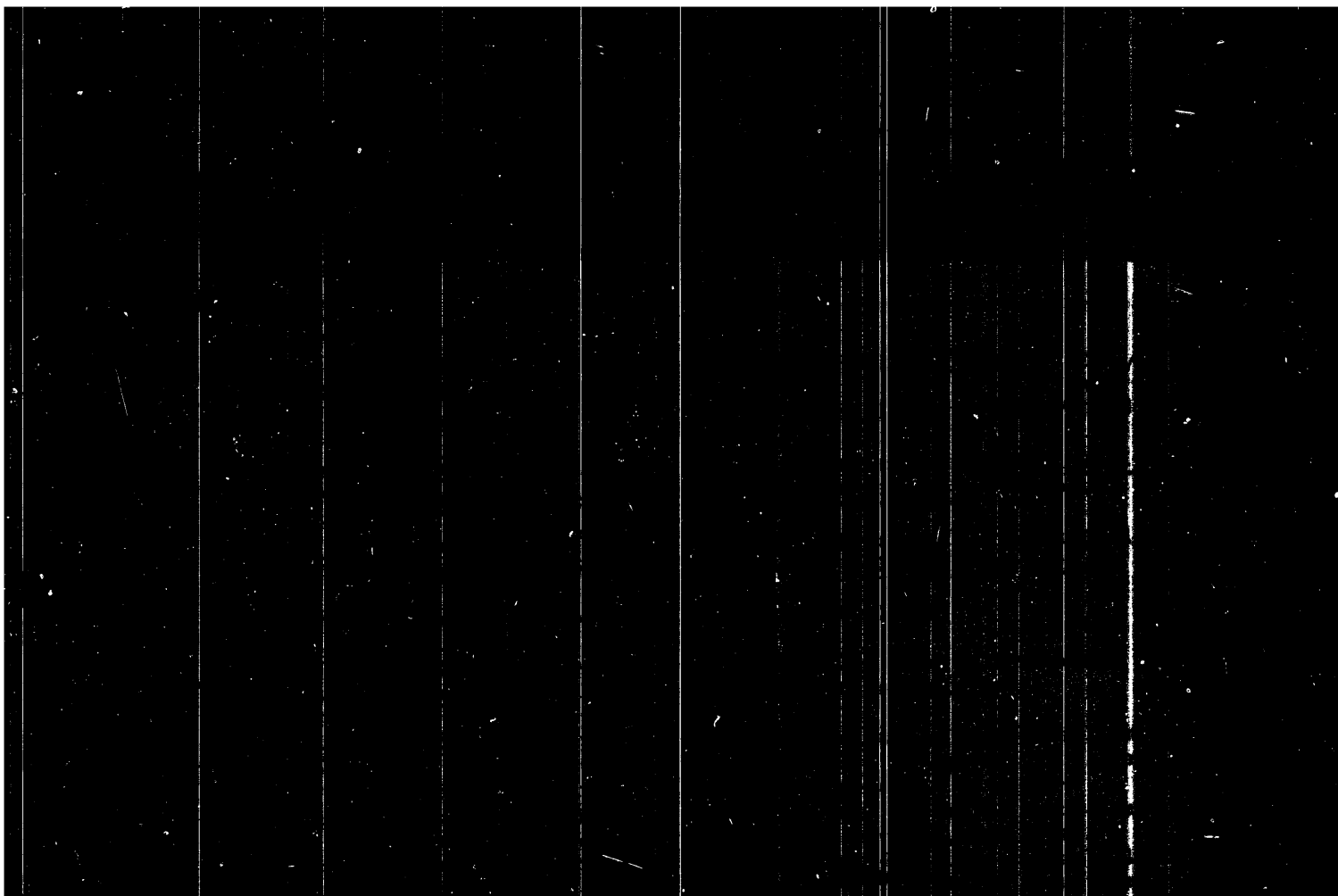


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ACCESSION NR: AP4009287

S/0125/64/000/001/0078/0081

AUTHOR: Sudenkov, Ye. G.; Molseyev, V. N.

TITLE: Diffusion welding of cast iron with steel

SOURCE: Avtomaticheskaya svarka, no. 1, 1964, 78-81

TOPIC TAGS: welding, diffusion welding, cast iron steel diffusion welding, SDVU-15 diffusion welder

ABSTRACT: An experimental development of a method of cast-iron-to-steel diffusion welding is described. Optimum welding conditions were determined with cylindrical 20-mm-diameter, 30-mm-long specimens welded by a standard SDVU-2 welder with an LGZ-10A, 8 kw, 380-450-kc generator. SCH15-32-steel-45, SCH21-40-steel-50, and ChNMKh-steel-10 combinations were tested. On the basis of the above experiments, an experimental ("semiproduction-type") SDVU-15 welder was constructed for pieces of up to 300-mm diameter and

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ACCESSION NR: AT4007052

S/2598/63/000/010/0293/0299

AUTHOR: Vinogradova, Ye. A.; Lashko, N. F.; Moiseyev, V. N.

TITLE: Formation of metastable phases and its effect on the properties of alpha and beta titanium alloys

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy*, no. 10, 1963. Issledovaniya titanovykh splavov, 293-299

TOPIC TAGS: titanium alloy, alpha beta titanium alloy, titanium alloy property, VT-14 titanium alloy, VT-14-1 titanium alloy, phase transformation, metastable phase formation, metastable phase, alloy phase composition

ABSTRACT: The authors point out that the Ti alloys VT-14 and VT-14-1 are characterized by large amounts of stable and metastable β phases, and that rapid quenching of VT-14 leads to the formation of the martensitic α' phase while VT-14-1 (containing more Mo and V) forms α' or α and β phases depending on the cooling rate. The present paper is devoted to an X-ray analysis of the phase transformations in these two Ti alloys, and to a study of their effect on the mechanical properties of the alloy. The effect of quenching from various temperatures on the mechanical properties of VT-14 is shown in Fig. 1 of the Enclosure, indicating that the strength increases with increasing quenching temperature while the yield point

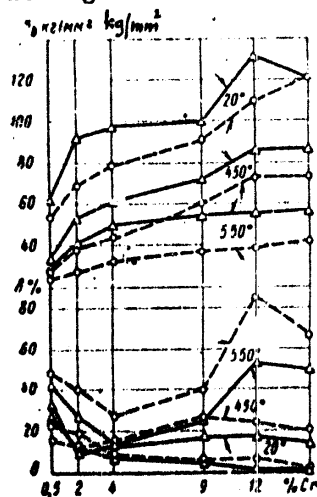
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Properties and

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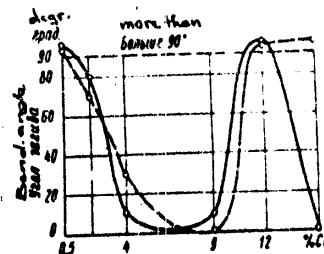
presence of Al this transformation was suppressed, which resulted in high ductility of welds in the 15% Cr - 3% Al-Ti alloy. There are 10 figures.

Fig. 9:



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Fig. 10:



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Properties and

Ti-Cr (continuous curves) and Ti-Cr-Al (broken curves) alloys that had been preliminarily annealed (1 hour at 700 °C in vacuum), the test temperature being indicated by each curve. [Abstracter's note: the information given in the text indicates that the broken curves in Fig. 9 relate to the Ti-Cr alloys and the continuous curves to the Ti-Cr-Al alloys.] 5) Weldability of the alloys - This property was assessed by bending tests conducted on argon-arc welded test pieces. The results are reproduced in Fig. 10, where the angle (deg) through which the test piece could be bent before cracking is plotted against the Cr content in Ti-Cr (continuous curves) and Ti-Cr-Al (broken curves) alloys. The gradual reduction in the ductility of the welds with increasing Cr content in the alloys was attributed to an increased degree of supersaturation of the martensitic phase formed during welding. Low ductility of the welds in alloys with the critical (near 9%) Cr content was due to the presence of the ω -phase. High ductility of the welds in the 12% Cr alloys was attributed to the formation of the ductile β -phase; loss of ductility of the welds in binary 15% Cr alloy was due to the eutectoid decomposition taking place during welding; in the Card 4/5

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Properties and

slightly after ageing at 300 and 400 °C, being unaffected or reduced by ageing at 500 and 600 °C. The strength of alloys with 2 and 4% Cr first increased and then decreased with increasing ageing temperature. The maximum strength of the alloys with 2% Cr, 4% Cr and 4% Cr + 3% Al being attained after ageing at 300, 400 and 500 °C, respectively. This effect was attributed to the fact that alloys of this group quenched from the $\alpha + \beta$ range retained the metastable α' - and β -phase which decomposed during the low-temperature ageing to produce finely dispersed α -phase precipitates. The hardness of the 9% Cr-Ti alloy increased considerably after ageing at 300 and 400 °C and decreased after ageing at 500 and 600 °C, the latter effect being attributed to the coalescence of the α -phase and decomposition of the ω -phase. The hardness of the 9% Cr - 3% Al-Ti alloy increased after ageing at all the test temperatures. The effect of ageing of quenched alloys containing 12 and 15% Cr was similar to that observed in the 9% Cr alloys. 4) Mechanical properties of the alloys at elevated temperatures - The results of these tests are reproduced in Fig. 9, where the UTS (σ_b , kg/mm²) and elongation (δ , %) are plotted against the Cr content (%) in Card 3/5

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content; in the case of the Ti-Cr-Al alloys they reached a minimum at 12% Cr and then increased slightly. 2) Mechanical properties of quenched alloys - The tests were conducted on specimens quenched from 700, 800, 900 and 1 000 °C. In the case of the Ti-Cr and Ti-Cr-Al alloys in which the β -phase was not retained on quenching, increasing the Cr content to 4% and raising the quenching temperature to the $\alpha + \beta$ range brought about an increase in strength and decrease in ductility owing to the formation of a metastable α' -phase. Binary alloys with the critical (9%) Cr content were brittle after quenching owing to formation of the ω -phase which, however, was suppressed in the Al-bearing alloys. The mechanical properties of alloys containing 12 and 15% Cr were not significantly affected by increasing the quenching temperature. 3) The effect of quenching followed by ageing - Hardness measurements and mechanical tests were conducted on specimens water-quenched from temperatures 50 °C above and below the temperature of the $(\alpha + \beta) \rightleftharpoons \beta$ transformation and then aged for 1/4, 1, 4, 16 or 64 hours at 300, 400, 500 or 600 °C. The hardness of alloys with up to 9% Cr increased after quenching from both $\alpha + \beta$ and β ranges; their hardness increased

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AUTHOR: Moiseyev, V.N.

TITLE: Properties and heat-treatment of Ti-Cr and Ti-Cr-Al alloys

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no. 2, 1963, 24 - 32

TEXT: The composition of the experimental alloys, melted in a vacuum-arc furnace, is given in a table. The impurities content did not exceed 0.05% Fe, 0.06% Si, 0.04% C and 0.011% O. Test pieces for various mechanical tests were prepared from either hot-forged or hot-rolled stock. The results can be summarized as follows: 1) the effect of the Cr content on the mechanical properties of alloys annealed at 700-800 °C and cooled slowly at 3 °C/min - The UTS and proof stress increased with increasing Cr content, reached a maximum of 110 - 140 kg/mm² in the former and 100 - 130 kg/mm² in the latter case at approximately 12% Cr and then decreased again; for any Cr content both the UTS and proof stress were increased by Al addition; elongation and reduction of area of Ti-Cr alloys decreased continuously with increasing Cr

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480 °C increased the strength and slightly decreased the ductility. Increasing the ageing time to 16 hours decreased the strength and increased the ductility. With increase in testing temperature, the strength of the alloy decreased. Tests of weldability showed the alloys consisting of a structure were most easily welded. The most promising alloys of the system are those containing 2.0-3.5% Mo and 0-2.5% Al, as well as those containing 6-8% Mo and 3% max Al. Alloys of these two groups have good ductility and satisfactory weldability and can be strengthened considerably by heat treatment.

There are 4 figures and 4 tables.

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Heat treatment and mechanical ...

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strength to 102 kg/mm² and decreases elongation to 9%. Bend tests showed that an increase in aluminium content decreased the ductility; the best ductility was obtained for alloys with 2-3% Al. The notch impact strength was tested at room temperature, -70 and -196 °C. Alloys with 7-8% Mo and up to 2% Al have a notch toughness of ≤ 5 kg/cm² at -196 °C. An increase in aluminium content resulted in a decrease in impact strength. Molybdenum had no effect at room temperature. With the exception of unalloyed titanium, all the samples showed a decrease in impact strength with decrease in temperature. The mechanical properties were also studied after water quenching from 700, 750, 800, 850 and 900 °C. With increase in temperature, the elongation increased as a result of a larger quantity of unstable β -phase in the structure. After quenching from 750, 800 and 850 °C the specimens were aged at 480 and 500 °C for 4 and 16 hours. The alloys containing more than 2.5-3% molybdenum showed a marked increase in strength. Alloys with 5-9% molybdenum reached 140-160 kg/mm². Increasing the temperature from which the alloys are quenched, or decreasing the ageing temperature from 500 to

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E021/E135

1P.1200

AUTHOR: Moiseyev, V.N., Engineer

TITLE: Heat treatment and mechanical properties of alloys
of the Ti-Mo-Al system

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
no.4, 1962, 36-40

TEXT: Twenty four alloys with a total content of molybdenum and aluminium of up to 9%, and with molybdenum:aluminium ratios of 3:1, 1:1 and 1:3 passing through the titanium-rich corner of the Ti-Mo-Al system were studied, together with binary titanium-molybdenum and titanium-aluminium alloys. Sponge titanium (UTS 40 kg/mm²), A00 aluminium and powdered molybdenum (99.9%) were used. Ingots weighing 5 kg were prepared in a vacuum arc furnace and 1.2 mm thick sheets were produced. The mechanical properties of samples from the sheet cut perpendicularly to the rolling direction were determined. In alloys annealed at 800 °C in vacuum for one hour and slow-cooled, an increase in the Mo and Al contents to 2.25-5.00 and 4.00-6.75% respectively, increases

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Alloys of the Ti-Al-Mn system

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treatment being 30 minutes. The optimum annealing temperature for alloys OT4-1, OT4 and VT4 has been found to be 700-750, 750-800, and 800-850 °C, respectively. In practice, however, owing to the tendency to excessive scale formation, lower annealing temperatures are employed (720-750 °C for alloy VT4, and 670-720 °C for alloys OT4 and OT4-1.). Internal stresses are removed by annealing at 500-600 °C. The annealing time is calculated on the basis of 10-15 minutes for each mm thickness of the strip, and should not exceed one hour. Acknowledgments are made to V.I. Dobatkin, I.N. Kaganovich, N.F. Anoshkin, S.A. Kusakevich and V.M. Novikova, who participated in this work. There are 5 figures, 3 tables and 2 references: 1 Soviet and 1 English. The English language reference reads as follows: Ref.1: R.F. Domagal, W. Rostoker. "TASM", V.47, 1955.

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Alloys of the Ti-Al-Mn system

point in kg/mm²; elongation in %; reduction in area %; impact strength, kg/mm²; Brinell hardness number, kg/mm²; elastic modulus, kg/mm²; shear modulus; Poisson ratio. The strength of these alloys decreases gradually with temperature and falls sharply above 450 °C which appears to be their maximum operating temperature. Their creep properties, satisfactory up to 350 °C, deteriorate at higher temperatures, which limits the field of application of these alloys. All these alloys can be readily argon-arc or spot-welded. The alloys are capable of being drawn, alloys OT4-1 and VT4 being, respectively, the most and least suitable for this purpose. Complex components can be drawn or pressed in several operations with intermediate anneals, or by preheating the blanks to 500-700 °C. The only heat treatment applicable to these alloys is annealing, the optimum annealing temperature increasing with increasing aluminium content. The effect of annealing on mechanical properties of alloy OT4 is illustrated in Fig.5, where UTS (σ_b , kg/mm², left-hand scale) and elongation (δ , %, right-hand scale) of strip preliminarily cold-rolled to 30% reduction in thickness, are plotted against the annealing temperature (°C), the duration of the annealing

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Alloys of the Ti-Al-Mn system

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alloys (as determined by the ductility of argon-arc welded joints) depends on the manganese content and deteriorates as the composition of the alloy changes from the aluminium to the manganese side of the ternary Ti-Al-Mn constitution diagram. Alloys with 1.5-2% Mn (that is those consisting of the α -phase only) have best weldability, approaching that of pure titanium or Ti-Al alloys. Alloys containing 5% or more manganese (that is those with the $\alpha + \beta$ structure) produce brittle welds. The ductility of these brittle joints can be improved by annealing at 750 °C. Welds annealed in this manner retained their ductility after 100 hours at 350, 450 and 550 °C with the exception of the ternary alloys containing more than 6.5% Al and the binary 9% Al-Ti alloy. On the basis of these results 3 industrial Ti-Al-Mn alloys OT4-1 (OT4-1), OT4 (OT4), and RT4 (RT4) were developed, their alloying additions content being given below: OT4-1, 1-2.5% Al and 0.6-1.0% Mn; OT4, 2-3.5% Al and 1-2% Mn; RT4, 3.5-5% Al and 1-2% Mn. The maximum impurity content in all cases was: 0.4% Fe; 0.15% Si; 0.1% C; 0.15% O; 0.05% N; and 0.015% H. The mechanical properties of these alloys are given in table 2, the first column of which reads: UTS, kg/mm². yield

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Alloys of the Ti-Al-Mn system

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to sheet 1.2-1.3 mm thick by the conventional methods, or forged to bars used for the preparation of impact strength test pieces. In the first stage of the investigation the following properties of the experimental alloys were determined. UTS at 20, 350 and 450°C, elongation at the same temperatures, impact strength at 20 °C, ductility of the alloys and welded joints (determined by bending tests), deep-drawing characteristics at 20 and 600 °C. The results which are reproduced graphically can be summarised as follows. 1) With increasing content of the alloying elements the UTS of titanium at room temperature increases from 51 to 115 kg/mm², its elongation decreases from 31 to 12%, and its impact strength decreases from 10 to 3.3 kgm/cm². 2) The UTS of titanium at elevated temperatures (350-450 °C) is increased by the additions of aluminium and manganese. 3) The plasticity of the Ti-Al-Mn alloys (as determined by the bending tests) decreases with increasing aluminium content and is increased by manganese additions of up to 9%. 4) Alloys with 6-7% of the alloying elements have satisfactory deep-drawing properties. At elevated temperatures the Mn-rich alloys are better in this respect than the Al-rich materials. 5) The weldability of the Ti-Al-Mn

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AUTHORS: Luzhnikov, L.P., Candidate of Technical Sciences, and
Moiseyev, V.N., Engineer

TITLE: Alloys of the Titanium--Aluminum--Manganese system

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
1961, No. 7, pp. 29-34

TEXT: The object of the present investigation was systematically to study the mechanical and technological properties of the Ti-Al-Mn alloys with a view to determining the optimum composition of alloys of this type suitable for fabrication in the form of sheet and strip. The composition of the experimental alloys is given in Table 1 under the following headings: alloy number, chemical composition (%) Al, Mn (repeated three times). The experimental ingots were prepared from titanium sponge, A-00 grade aluminum, and Mn-1 grade manganese in an arc furnace with a consumable electrode in a mixture of argon and helium by the method of double smelting. The alloys contained the following impurities: 0.025-0.050% Fe; 0.015-0.025% Si; 0.035-0.050% C; 0.050-0.070% O; 0.025-0.035% N; 0.005-0.009% H. The ingots were then rolled down
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Heat treatment, structure, and properties...

S/762/61/000/000/022/029

consists of fairly large particles of primary α phase, residual β phase, and the dispersive α phase (which affords strength and hardness to the alloy) formed as a result of the decomposition of the β phase. An investigation of a VT14 alloy containing 4.22% Al, 3.05% Mo., 0.85% V, 0.03% Fe, 0.07% Si, and 0.007% C indicates that the optimal anneal procedure for this alloy, affording an elevated plasticity (elongation 15-18% and a necking of 40-50%) and a satisfactory strength ($\sigma_b = 90-95 \text{ kg/mm}^2$), consists of heating to 750-850°C for 40-60 min with subsequent air-cooling. The quench and age-treated VT14 has a tensile strength of 120-140 kg/mm^2 and an elongation of 7-12%. Optimal quench is in water from 860-880°, with aging at 480-500° for 12-16 hrs. The heating time of rod material at pre-quench temperature may be limited to approximately 15 min. The VT14 alloy is extremely sensitive to overheating during plastic hot deformation and heat treatment. A heating of the alloy to above 920-930° leads to a sharp impairment of the mechanical properties of the alloy after hardening heat treatment. Hence, hot working should be performed at T not to exceed 920-930°, with a reduction in area of the metal at that temperature of not less than 50%. There are 22 figures and 1 (unnumbered) table; no references.

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S/762/61/000/000/022/029

AUTHORS: Glazunov, S.G., Moiseyev, V.N.

TITLE: Heat treatment, structure, and properties of the BT14 (VT14) alloy.

SOURCE: Titan v promyshlennosti; sbornik statey. Ed. by S.G. Glazunov. Moscow, 1961, 232-244.

TEXT: The paper describes an experimental investigation intended to establish an optimal heat-treatment procedure for the Ti-Al-Mo-V alloy VT14. The principal function of the alloying elements is the stabilization of the β phase in the titanium; the alloy may, therefore, be termed a martensitic alloy. The alloy contains 3.5-4.5% Al, 2.5-3.5% Mo, 0.7-1.5% V, with admixture not to exceed 0.4% Fe, 0.15% Si, 0.1% C, 0.15% O, 0.05% N, 0.015% H. In the absence of eutectoid-forming admixtures the equilibrium state consists of an α phase with a hexagonal lattice and a small quantity of cubic β phase. A step-by-step discussion explores the effects of various quenching and anneal processes having their inception below and above the boundary of martensitic transformation, respectively. The mechanical properties of VT14 alloy with the metastable phases β and α' in the structure are significantly affected by low-temperature aging as a result of dispersive hardening. The aging reaction leads from the primary Mo-poor β phase to an enriched β phase with separation of Mo-poor α phase and, finally, to the equilibrium β phase for the given tempering temperature and α phase. Thus, following aging, the VT14 alloy

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**Heat Treatment and Mechanical Properties of Titanium Alloys
Containing 5 to 13% Aluminium**

ductility of alloys containing 8 to 11% Al; after quenching from 700 to 1100°C the alloys had an elongation of 12 to 15%. For improving the properties of alloys containing 11% Al a higher quenching temperature was required (1000 to 1200°C) and in this case the elongation was 47%. Alloys containing 12 and 13% Al remained brittle even after quenching.

3) Quenched alloys containing over 7% Al embrittled after ageing for 100 hours at temperatures of 450°C and higher. However, ageing for 100 hours at 400°C or lower temperatures did not result in any appreciable change in the mechanical properties.

4) Introduction into the alloy of Ti with 9% Al, tin, Zr, Cr or Mo to an extent of 3% reduces the thermal stability of the quenched alloys; after ageing for 100 hours at 400°C the alloys became strongly embrittled and assumed properties which are characteristic for the annealed state. There are 5 figures, 6 tables and 4 references, 2 of which are Soviet, 1 German and 1 English.

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Heat Treatment and Mechanical Properties of Titanium Alloys
Containing 5 to 13% Aluminium

mechanical properties of the investigated ternary alloys after quenching in water from 700 to 1000°C are entered in Table 4; the ductility of quenched alloys proved to be higher than that of annealed ones. The mechanical properties of ternary alloys quenched from 900°C in water and aged at 400, 450 and 500°C respectively for 100 hours are entered in Table 5, whilst the results of short duration tests at various temperatures for Ti alloys containing 9% Al plus 3% of either Sn, Zr, Cr or Mo after quenching from 900°C in water are entered in Table 6. The following conclusions are arrived at:

- 1) Titanium alloys with Al in the annealed state containing over 7% Al are characterized by poor ductility and alloys containing over 9 to 10% Al showed brittle fractures after tensile tests.
- 3) Quenching in water from 700 to 1100°C improves the

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**Heat Treatment and Mechanical Properties of Titanium Alloys
Containing 5 to 13% Aluminium**

first and then decreases. The plot, Fig 3, shows the mechanical properties of Ti-Al alloys quenched in water from temperatures between 700 and 1200°C. Fig 4 shows a plot of the mechanical properties of Ti-Al alloys quenched in water from 900°C and aged at 400, 450 and 500°C for 100 hours. Fig 5 shows a plot of the mechanical properties of Ti-Al alloys quenched from 900°C and tested at temperatures between 500 and 800°C. The influence of a third component was investigated on a series of specimens which contained respectively Sn (2.84%), Zr (3.2%), Cr (2.86%) and Mo (3.07%) with Al contents of about 9%; the chemical composition of these specimens is entered in Table 2. The mechanical properties of these ternary alloys, soaked at 800 and 900°C for one hour and cooled in the furnace with a speed of 2 to 3°C/min, are entered in Table 3; all the alloys, with the exception of that containing Mo, showed brittle fracture. The ✓

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Heat Treatment and Mechanical Properties of Titanium Alloys
Containing 5 to 13% Aluminium

smelting in a vacuum arc furnace and for improving the uniformity of the alloys they were re-smelted twice. The chemical composition is given in Table 1, the main difference between the individual melts was the Al content which was varied within the limits of 4.45 and 12.56%. The ingots were forged into 12 mm diameter rods, whereby the alloys containing 5, 6 and 7% Al were heated to 1050-1100°C, the alloys containing 8.9 and 10% Al were heated to 1100-1150°C and the alloys containing 11, 12 and 13% Al were forged at 1150-1200°C. No defects were observed which could be associated with a reduced plasticity of the material. The mechanical properties of the Ti-Al alloys are plotted in Fig 2 for Al contents up to 12%. The results were obtained after soaking the specimens at 700, 800 and 900°C for one hour, cooling to 300°C in the furnace at a speed of 2 to 3°C/min and, following that, cooling in air. With increasing Al content the strength increases at

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AUTHOR: Moiseyev, V. N., Engineer

TITLE: Heat Treatment and Mechanical Properties of Titanium
Alloys Containing 5 to 13% Aluminium ✓

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
1960, Nr 6, pp 30, 35-39 + 1 plate (USSR)

ABSTRACT: The aim of the work described in this paper was to determine the mechanical properties of titanium alloys containing 5 to 13% Al as a function of the heat treatment regime. The influence of a third component on the mechanical properties of a titanium alloy with 9% Al was also investigated. In accordance with the diagram of state published by Sagel, Shulz and Zwicker (Ref 1), the composition of the alloys was so chosen as to include the zones α , $\alpha + \alpha_2$ and α_2 . It was assumed that the effect of heat treatment is associated with the temperature dependence of the solubility of Al in α -Ti. The alloys were produced from sponge titanium TG-00, with an ultimate tensile strength of 37 kg/mm², and aluminium A-00. The ingots (4 kg) were produced by ✓

Card 1/5

SOKOLIKOV, K.I.; MOISEYEV, V.N.

Hot rolling of commercial titanium and some of its alloys. Titan
i ego splavy no. 1:162-179 '58. (MIRA 14:5)

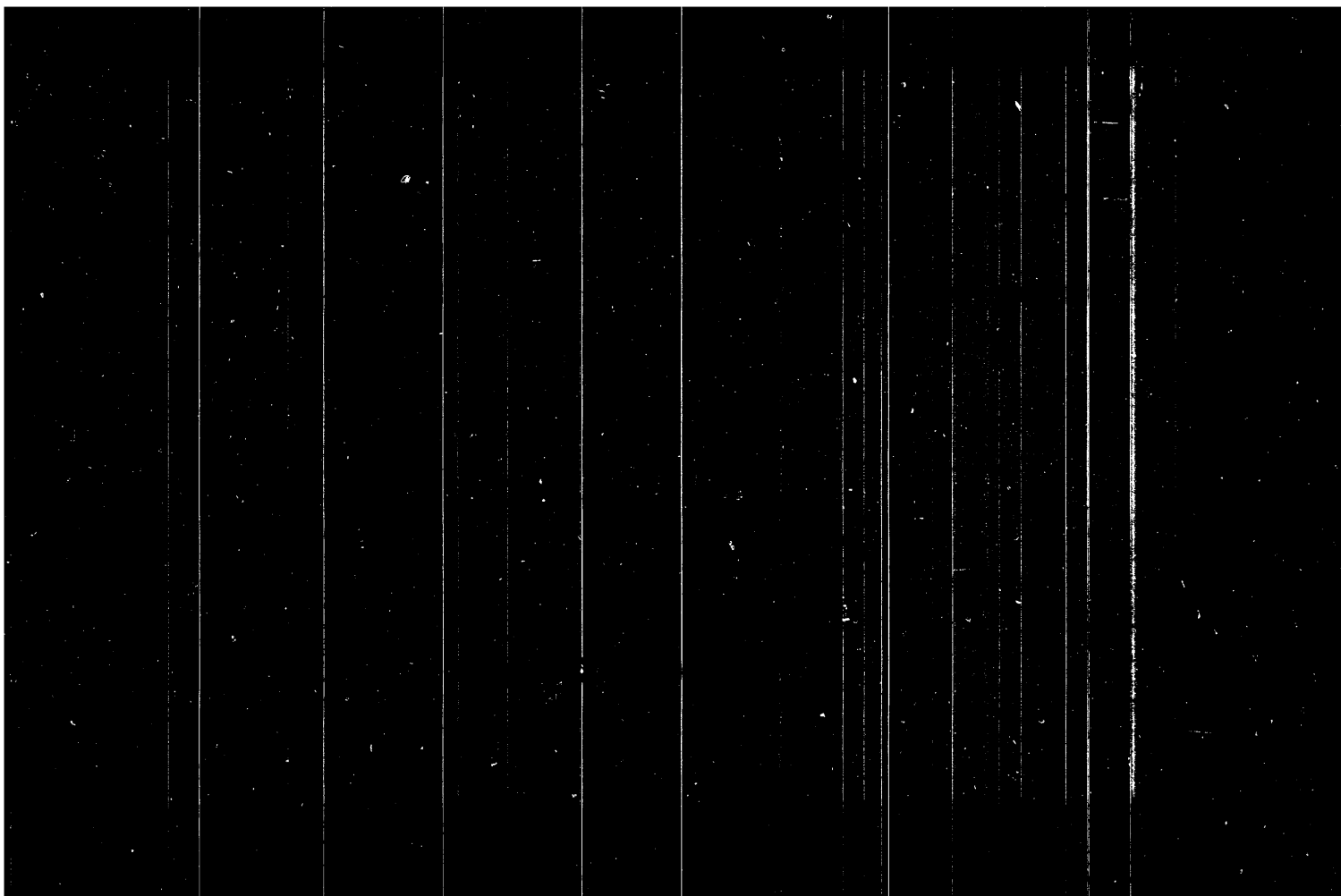
1. Ministerstvo aviatsionnoy promyshlennosti SSSR.
(Titanium) (Rolling (Metalwork))

Chemical Dept.
 Vol. 2, No. 3
 Apr. 25, 1971
 News, Party Life, Masses, and
 Detachments

The chemical industry is one of the most important branches of the national economy. It is the basis for the development of the country's industry and agriculture. The chemical industry is a complex of various enterprises, including the production of organic and inorganic chemicals, plastics, and other materials. The chemical industry is a key sector in the national economy, and its development is essential for the country's economic growth. The chemical industry is a complex of various enterprises, including the production of organic and inorganic chemicals, plastics, and other materials. The chemical industry is a key sector in the national economy, and its development is essential for the country's economic growth.

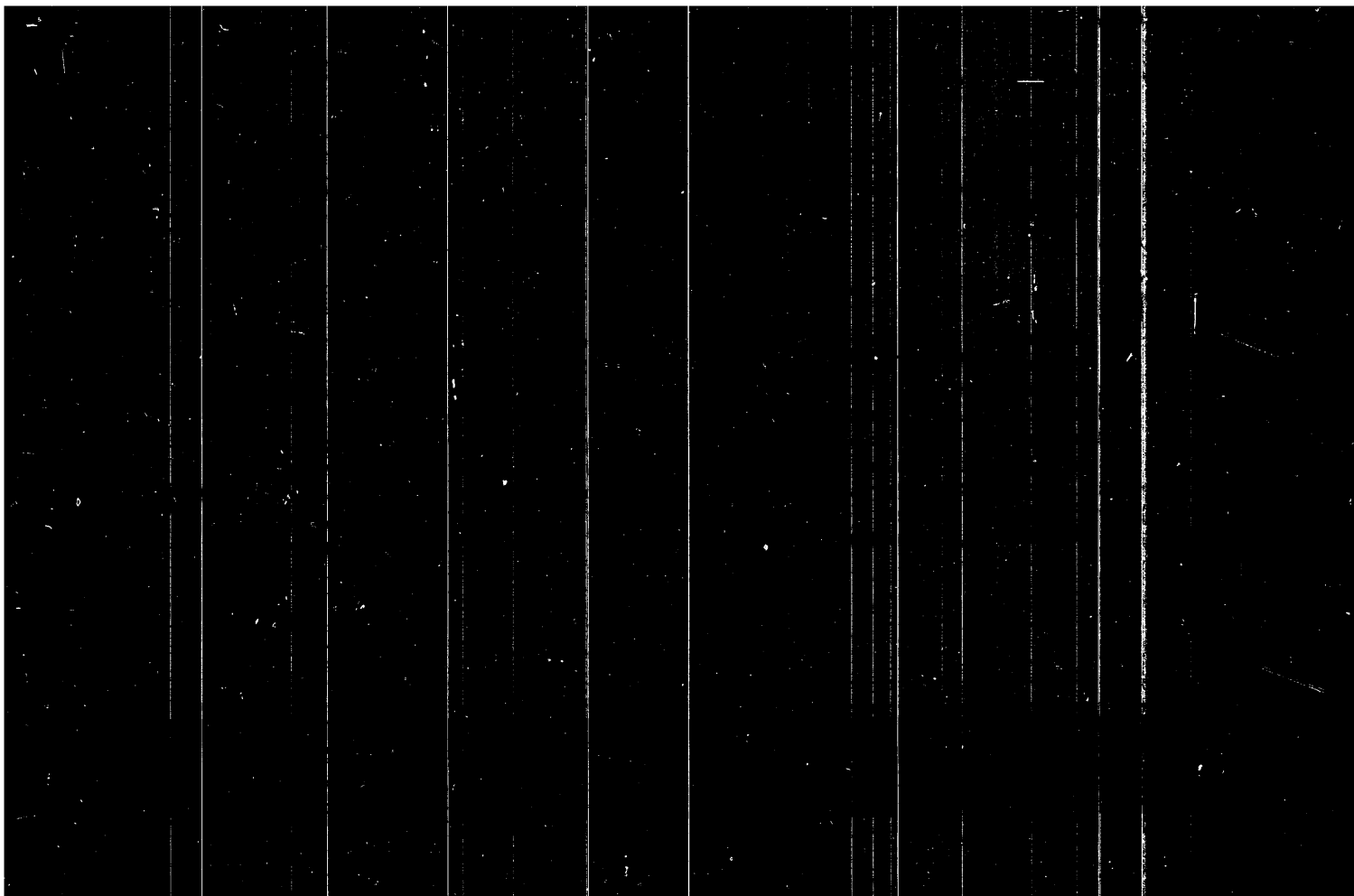
Vladimir N. Krukavskiy

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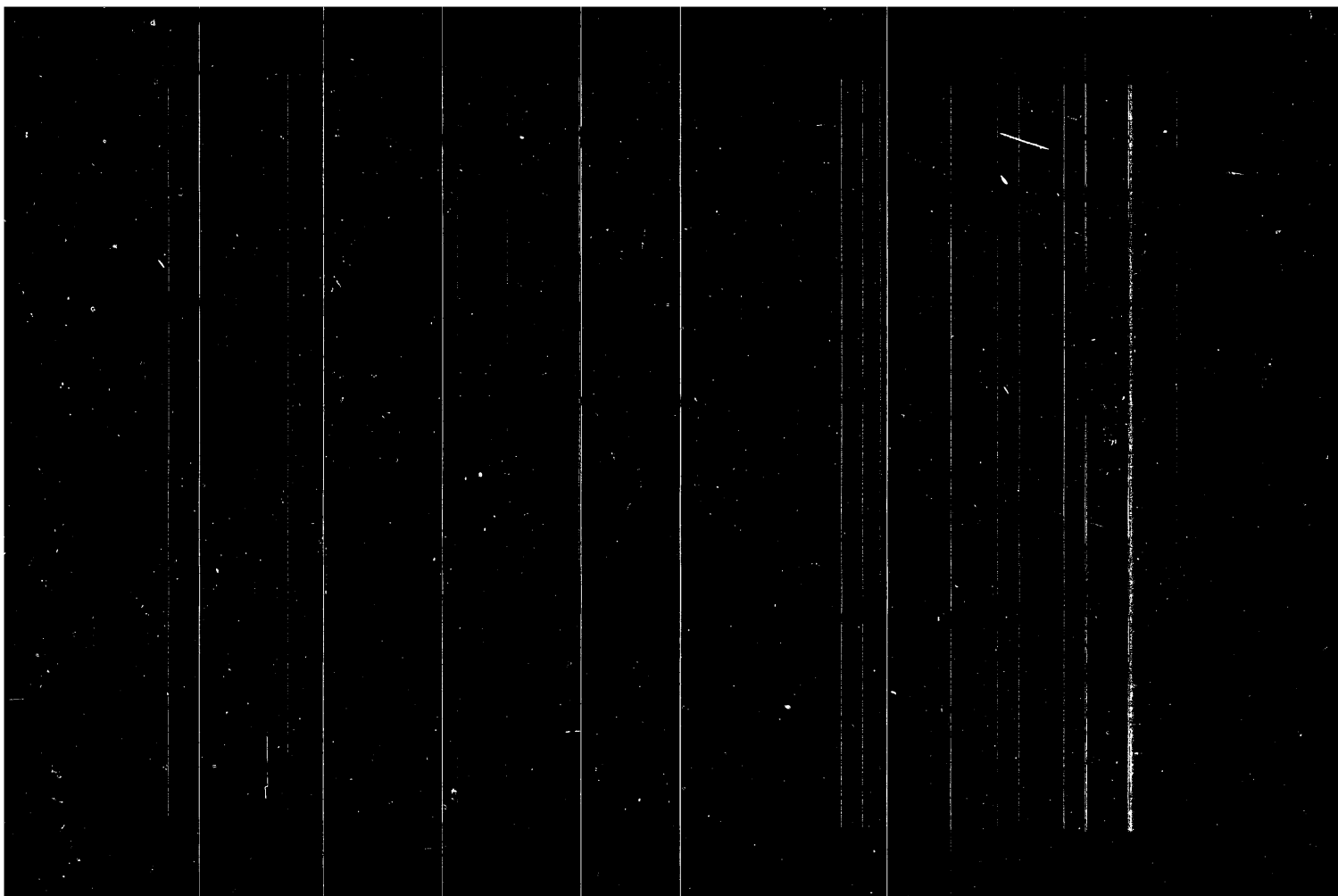
Determining the direction of the motion of the automobile
according to medicolegal data. Sud.-med.ekspert. 7 no. 2:14-15
Ap-Je '64. (MIRA 17:7)

1. Khar'kovskoye oblastnoye byuro sudebnomeditsinskoy
ekspertizy (nachal'nik V.M.Moiseyev).

LIFSHITS, Mikhail Naftol'yevich; MOUSEYEV, Viktor Mikhaylovich;
SADOVSKIY, F.T., red.

[Electrical effects in aerosols and their applications]
Elektricheskie iavleniya v aeroliakh i ikh primeneniye.
Moskva, Energiya, 1965. 223 p. (MIRA 18:3)

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MOISEYEV, V.M., fel'dsher

Is a commodity turnover plan necessary for a rural drugstore?
Fel'd. 1 akush. 25 no.9:63 8 '60. (MIRA 13:9)

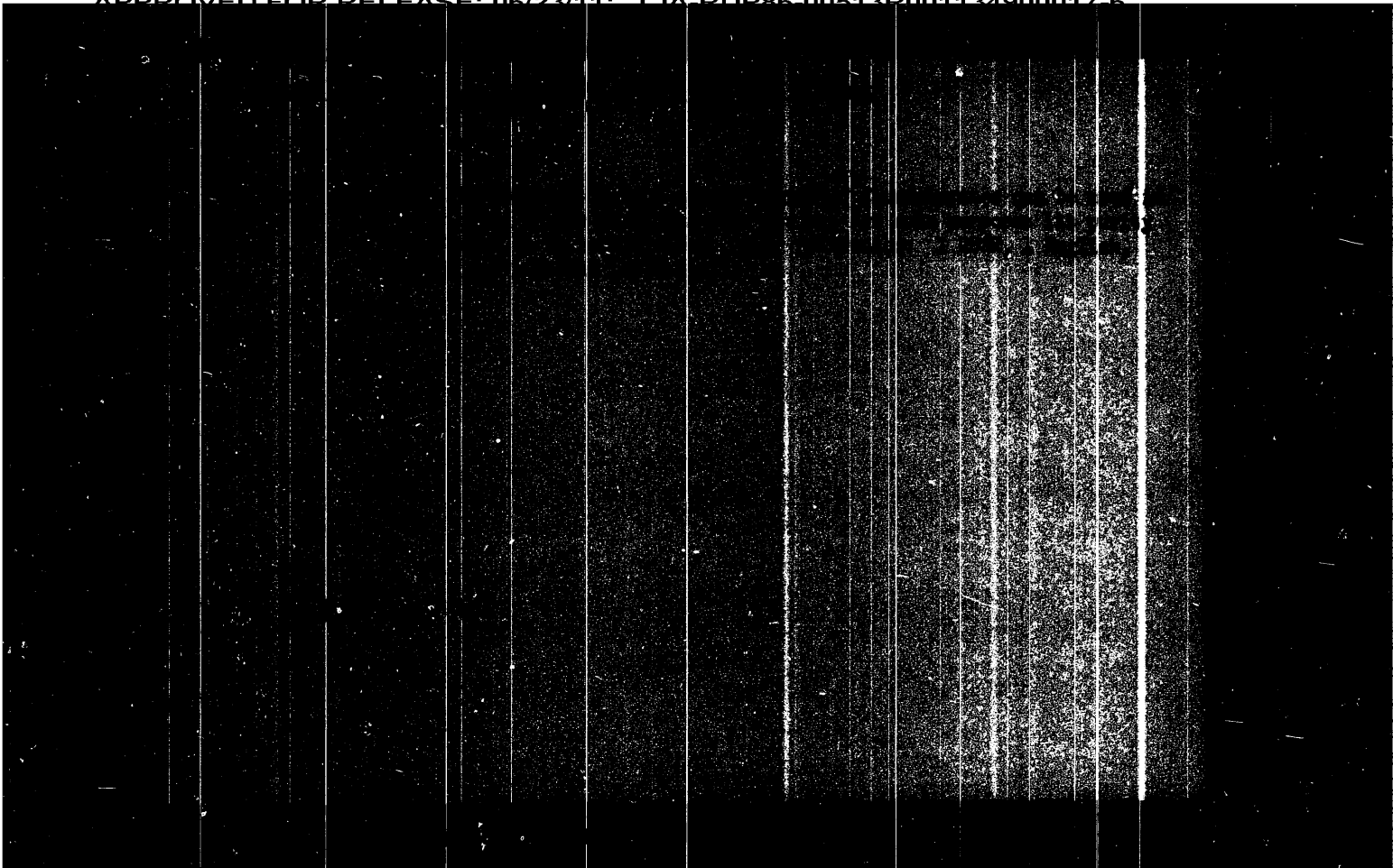
1. Novo-Turmyshenskiy fel'dsherskiy punkt Chuvashskoy ASSR.
(DRUGSTORES)

MOISEYEV, V.M., kandidat meditsinskikh nauk

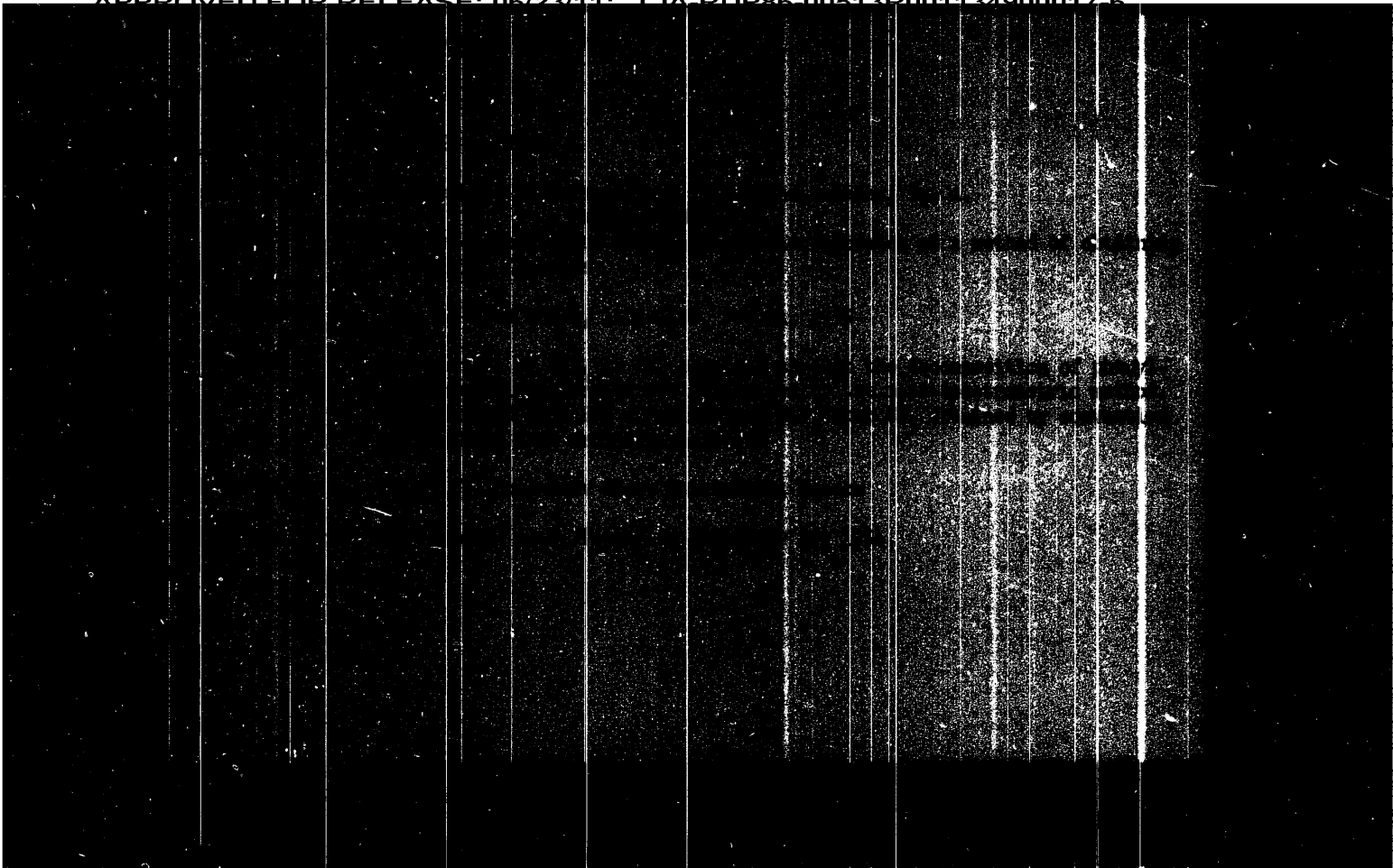
Progress of public health services in Yugoslavia. Sov.sdrav. 15
no.4:56-59 J1-Ag '56. (MIRA 9:9)

1. Iz Kuibyshevskogo meditsinskogo instituta.
(PUBLIC HEALTH,
in Yugoel. (Rus))

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MOISEYEV, V.M., Geroy Sotsialisticheskogo Truda

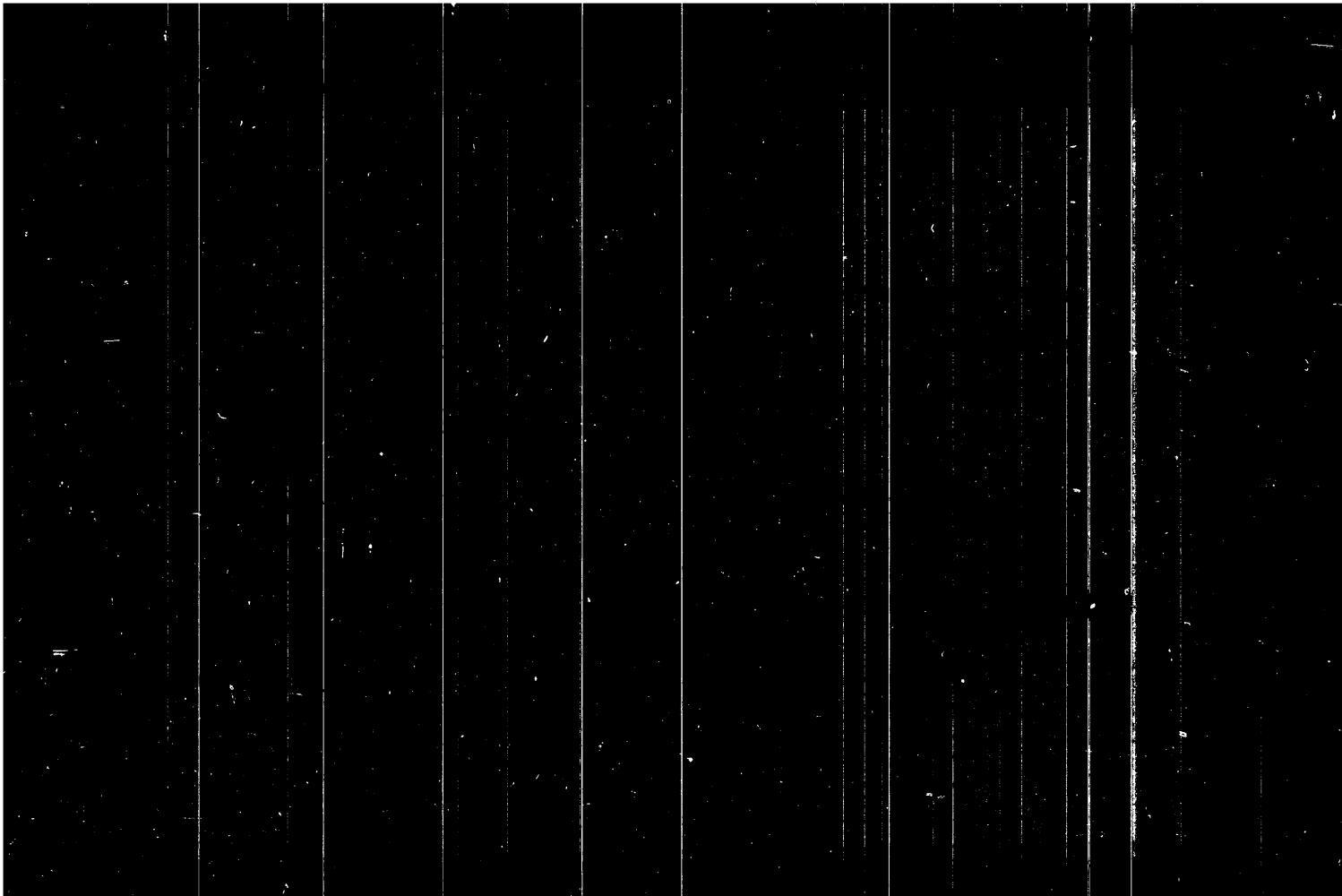
Maintenance of locomotives in good order and correct
operation of the train are very important. Elek.i tepl.
tiaga 3 no.9:1-4 S '59. (MIRA 13:2)

1. Starshiy mashinist depo Osherel'ye, Moskovskaya doroga.
(Electric locomotives)

MOISEYEV, V.I.

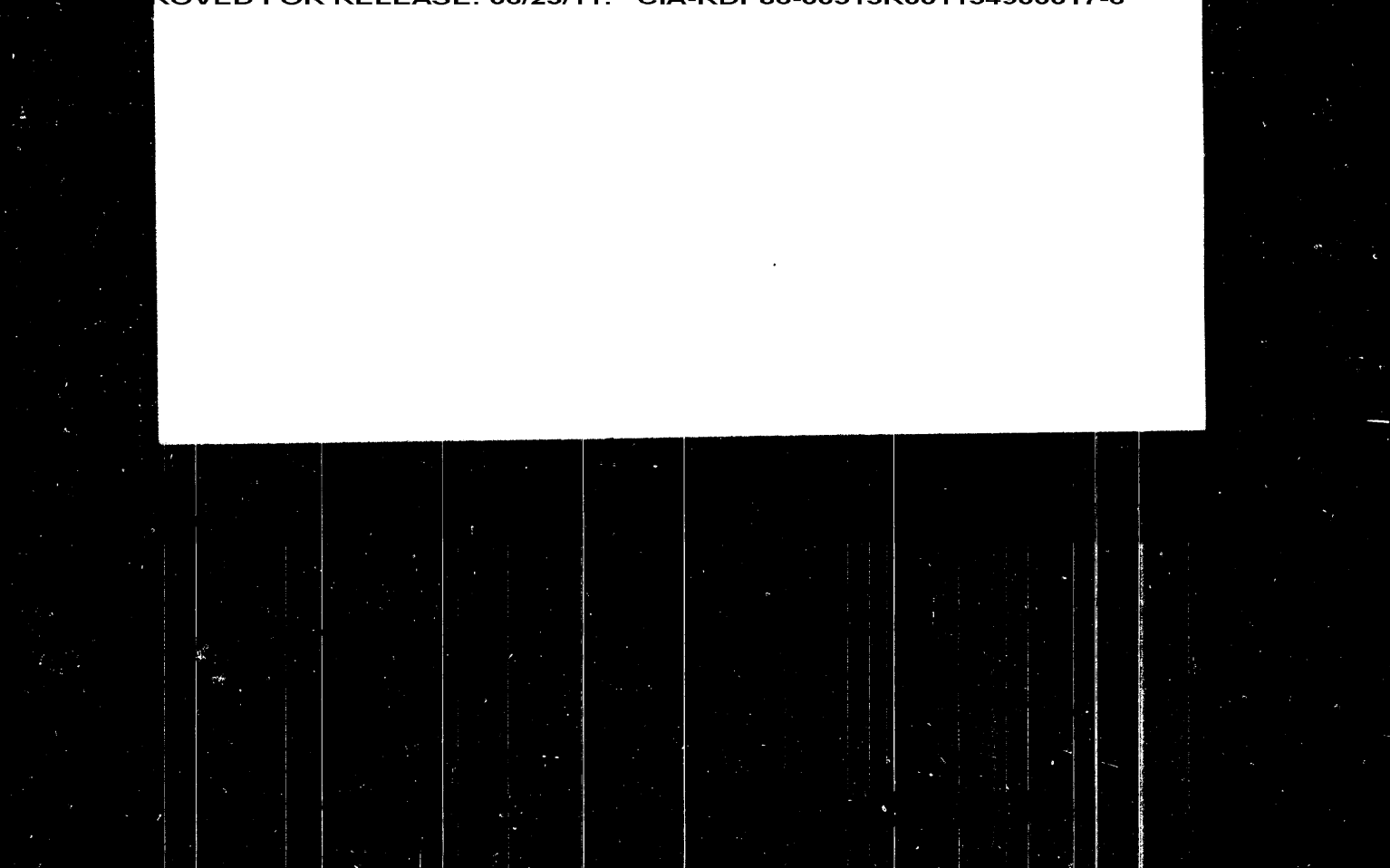
New method of bending. Stek.l ker. 19 no.5:30 My '62. (MIRA 15:5)
(Glass)

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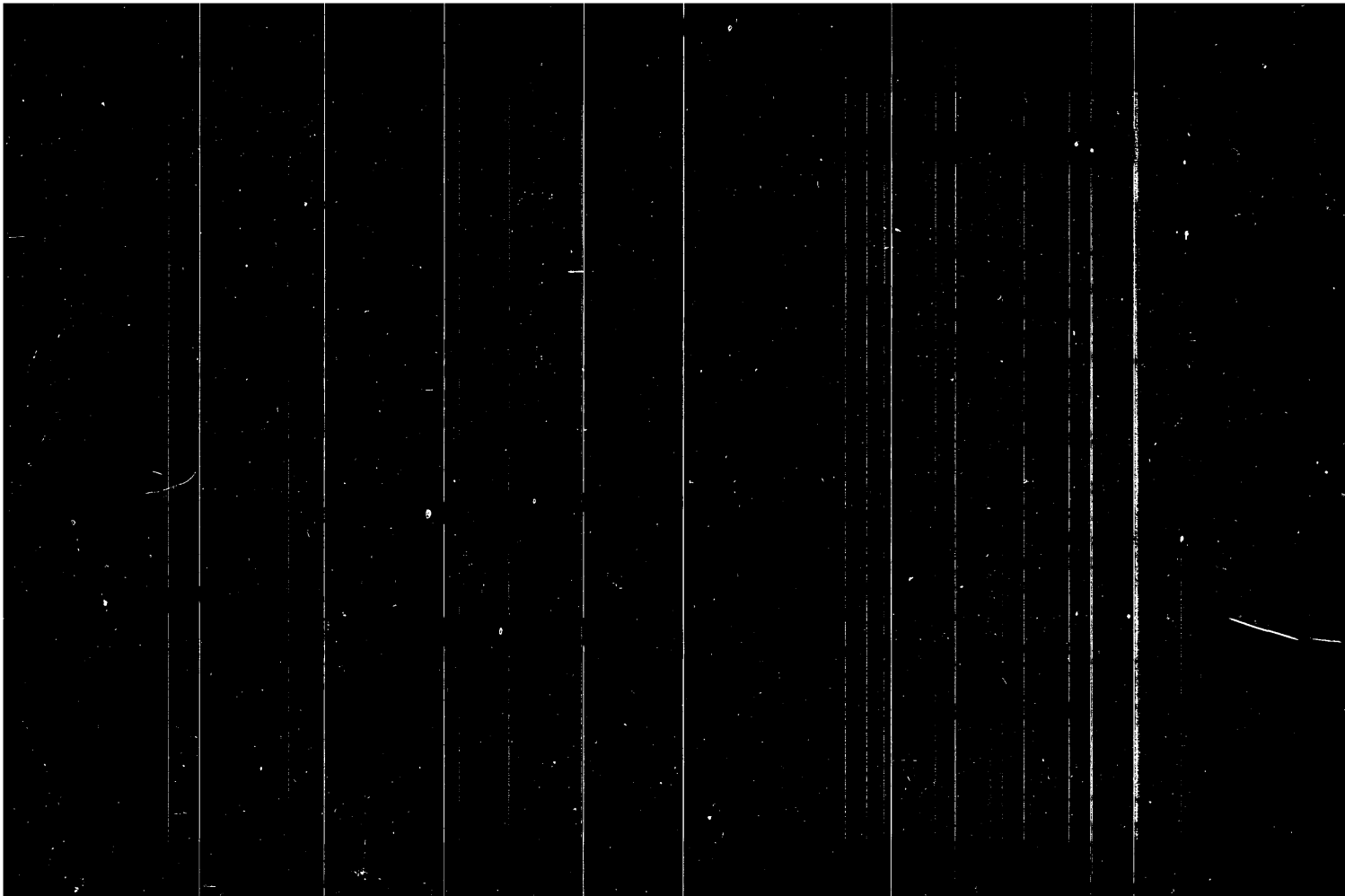


GELLER, Yu.A.; MOISEYEV, V.F.

Effect of titanium and niobium on the properties of high-speed
steel. Izv. vys. ucheb. zav.; chern. met. 8 no.5:152-156 '65.
(MIRA 18:5)

1. Moskovskiy stankoinstrumental'nyy institut.

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001134900017-6



APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001134900017-6

MOISEYEV, V.F.; GELLER, Yu.A.

Effect of cobalt on the structure and properties of high-speed
steel. Izv. vys. ucheb. zav.; Chern. met. 6 no.11:168-176
'63, (MIRA 17:3)

1, Moskovskiy stanko-instrumental'nyy institut.

GELLER, Yu.A.; MOISEYEV, V.F.; KOLTUNOV, A.A.

Heat conductivity of high-speed steels. Metalloved. i term. obr.
met. no.9:2-7 S '63. (MIRA 16:10)

1. Moskovskiy stankoinstrumental'nyy institut.

S/133/60/000/005/003/003

Heat Treatment of Spring Alloys Used at High Temperatures

bonding strength in the crystal lattice under the influence of molybdenum, (according to the data of Shteynberg, M. M.). The third steel type H30X12TMBE (H80Kh12TMVB), marked ПБ (PV) had the following composition: C 0.095%; Si 0.85%; Mn 0.89%; Ni 79.05%; Cr 11.18%; Ti 2.63%; Al 0.91%; Nb 1.38%; Mo 3.47%. After testing the strengthening under various heat conditions, the elastic properties of the alloy were investigated with hardening at 1,050°C-1,100°C and tempering at 650°C, 700°C and 750°C, for 5 and 10 hours. The slightest changes in the modulus of normal elasticity were found in samples hardened from 1,050°-1,100°C after tempering at 750°C. A higher tempering temperature causes a corresponding increase in the structural stability and the bonding strength. This was proved by the changes in the temperature coefficient of the elasticity modulus. The optimum heat regime for the PV steel involves a hardening temperature of 1,100°C in water for 10 hours and tempering temperature of 750°C, while the maximum value for the elasticity limit was obtained by heating after this treatment to 500°C. The results obtained under this heat treatment were better than those obtained by Grawford (Ref. 9) at the following conditions: hardening temperature 1,150°C, first tempering at 850°C for 24 hours, second tempering at 700°C for 20 hours. There are 7 figures and 9 references: 8 Soviet and 1 English.

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S/133/60/000/005/003/003

Heat Treatment of Spring Alloys Used at High Temperatures

and to obtain a higher heat-resistance, although this could only be done at the expense of the elasticity limit at normal temperature. After establishing and comparing the limits and the moduli of elasticity, as well as the electrical resistance of both alloys subjected to the same condition of heat treatment, it was found that by adding molybdenum to the EI702 N36KhTtU alloy the bond strength in the lattice of the solid solution was increased resulting in a higher strength and hardness of the alloy both after hardening and tempering, while the kinetics of hardening were not changed essentially. The moduli of elasticity for both types (PA and PB) changed in linear relation with the test temperature and this conformity promoted the thermal compensation of the changes in the elasticity modulus and is a valuable property of spring steels used in instruments. Tests at various holding times (25 sec and 1 hour) and different temperatures established that the PA steel was not sufficiently heat-resistant and when improving its heat-resistance by hardening at 1,100°-1,150°C its elastic properties were lowered. On the other hand, the PB steel kept its high elastic properties even at 300°C on account of the strengthening of the boundary zones of the crystal grains in connection with the reduced extent of the decomposition of the solid solution and the general increase in the

Card 2/3

S/133/60/000/005/003/003

AUTHORS: Rakhshtadt, A. G., Candidate of Technical Sciences, Docent,
Sol'ts, V. A., Candidate of Technical Sciences,
Moiseyev, V. F., Engineer

TITLE: Heat Treatment of Spring Alloys Used at High Temperatures

PERIODICAL: Stal', 1960, No. 5, pp. 468-472

TEXT: Tests were carried out on the elastic properties of three types of spring steels during heating under various conditions. First two austenitic spring steels were tested with the following composition: an M 702 (EI702) type alloy: H36XT10 (H36KhTYu), Cr 12.0%; Ni 35.3%; Ti 2.98%; Al 0.68%, marked ПА (PA), and an M 702 (EI702) type alloy: H36XT10M5 (H36KhTYuM5), C 0.035%; Si 0.39%; Mn 1.15%; Ni 35.9%; Cr 13.08%; Ti 2.79%; Al 1.23% and Mo 4.70%, marked ПБ (PB). The ingots tested were forged, cold- and hot-rolled, with intermediate hardening at 1,000-1,100°C. The samples were pressed from cold-rolled strips 0.3 mm thick. The heat treatment for the PA alloy differed from the conventional inasmuch as after hardening (started at 950°C) in water tempering took place during 8 hours instead of 2-3 hours at 750°C, in order to stabilize the structure more effectively

Card 1/3

DRACHINSKIY, A.S.; MOISEYEV, V.F.; TREFILOV, V.I.

Dependence of the type of plastic deformation (slip, twinning)
on the grain size in polycrystalline iron. Dokl. AN SSSR 154
no.5:1078-1081 F'64. (MIRA 17:2)

1. Institut metallofiziki AN UkrSSR. Predstavleno akademikom
G.V.Kurdyumovym.

DRACHINSKIY, A.S.; MOISEYEV, V.F.; TREFILOV, V.I.

Conditions of the start of flow and the failure of iron.

Sbor. nauch. rab. Inst. metallofiz. AN URSS no.18:18-21

*64

(MIRA 17:8)

MOISEYEV, Vladimir Dmitriyevich
~~V. D.~~

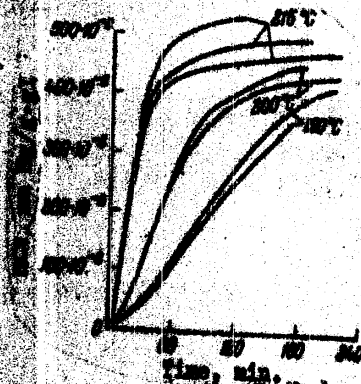
Voprosy kibernetiki v biologii i medicine [Problems of Cybernetics in Biology
and in Medicine], Moscow, 1960, 320 pages.

The formation of these products as well as of hydrogen, carbon monoxide and benzene isolated among the products is suggested. Stabilization of the reaction by addition of suitable inhibitors of radical-chain reactions such as BHT, DABCO, 2, 6-di-*t*-butyl-4-methylphenol, and 2, 2, 6, 6-tetramethylpiperidine.

REF ID: A7602943

Figure 1 indicates that the reaction is

Fig. 1. Pressure of H_2 evolved during
the decomposition of I, as
function of time and
temperature.



decomposition of I. The pressure of H_2 , C_2H_4 , hydrocarbons among gaseous
products of reaction is explained by free radical-chain decomposition process.

SECRET 0001/0001/0001/0001 1.2/01 00/00

REF ID: A600003 (A)

SOURCE CODE: UR/0191/66/000/002/0005/0006

AUTHORS: Moiseyev, V. D.; Dushkin, V. I.; Neyman, M. B.

DATE: 1966

TITLE: Composition of decomposition products and mechanism of thermal decomposition of polyvinyl chloride

ABSTRACT: Khimicheskoye meny, no. 2, 1966, 5-8

KEYWORDS: Free radical, thermal decomposition, combustion mechanism, polyvinyl chloride

SUMMARY: Products and kinetics of thermal decomposition of polyvinyl chloride (PVC) of 65-70% have been investigated to determine the mechanism of the reaction. Polymer of V, with bulk density 0.54 g/cc (containing less than 0.007% of impurities and stabilizers), was used for experimentation. The products of decomposition, as well as analytical methods, have been described earlier by M. B. Neyman, M. B. Neyman, and V. D. Moiseyev (Dokl. Akad. Nauk SSSR, 1961) and by V. D. Moiseyev, M. B. Neyman, and V. I. Dushkin (Dokl. Akad. Nauk SSSR, 1961).

REF ID: A600003 (A)

MOISEYEV, V.D.

Quantitative composition of the volatile products of the thermal
degradation of polymers and the kinetics of radical isomerization.
Plast.massy no.12:3-7 '63. (MIRA 17:2)

PANCHENKOV, G.M.; MAKAROV, A.V.; D'YACHENKO, V.Ya.; MOISEYEV, V.D.

Thermal diffusion of BF_3 under pressure. Vest. Mosk. un. Ser. 2:
Khim. 18 no.3:33-36 My-Je '63. (MIRA 16:6)

1. Kafedra fizicheskoy khimii Moskovskogo universiteta.
(Boron fluorides) (Boron isotopes)

Thermal destruction of ...

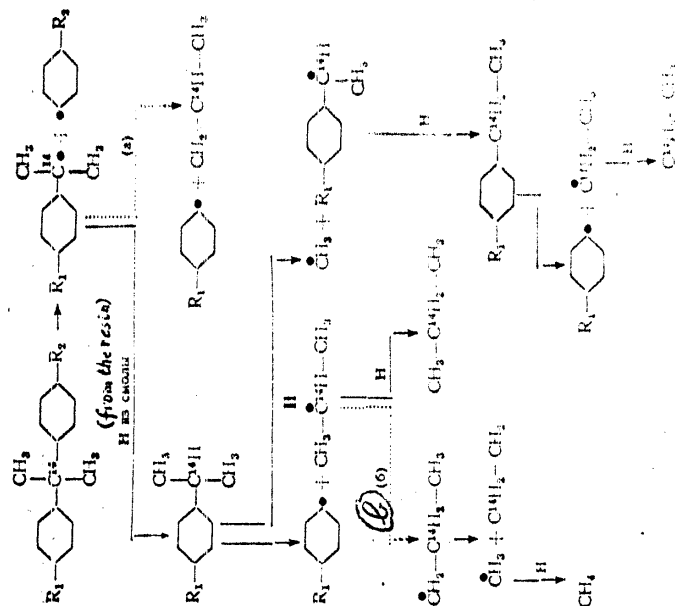
3/191/62/000/006/004/016
3110/3138

The decomposition of radical I by reaction (a) (see Fig.) is inhibited by the stabilizing effect of the phenyl group. The isomerization of radical II by reaction (b) requires ~ 17 kcal/mole. For this reason, only a small amount of labeled ethylene is formed. As shown also by the paramagnetic electron resonance spectra, the tagged central carbon atom of diphenylolpropane participates in the formation of heat-resistant, condensed aromatic and other systems with conjugate double bonds. As the 912 cm^{-1} band of the epoxy group disappears in the infrared spectra of the solid decomposition products of the resin, stable free radicals are formed as reported by M. B. Neyman et al. (Vysokomol. soyed., 1, 10 (1959)). There are 5 figures and 3 tables.

Card 5/5

Thermal destruction of...

6/191/62/000/006/004/016
B110/B130



Card 4/5

Thermal destruction of ...

8/19/62/000/000/004/016
B110/B178

decomposition products (propane at 300°C = 4.6 %; at 400°C = 5.62 %) show that the decomposition products derive from the aliphatic part of the resin molecule. The mechanism is presumably

Card 3/5

Thermal destruction of ...

S/191/62/000/006/004/016
B110/B136

(3) C_2H_4 ; (4) C_3H_8 ; (5) C_3H_6 . The specific activity of the aldehydes in the first collecting flask was determined by A. F. Lukovnikov's method (ZhAKh, 11, 299, (1956)). The percentages by weight for H_2 , CO , CH_4 , C_2H_6 , C_2H_4 , C_3H_8 , C_3H_6 , solid residue, and aldehyde at $300^\circ C$ were respectively: - ; 1.18; 0.411; 0.025; 0.016; 0.015; 0.068; 98.4; and 0.00023; at $400^\circ C$: 0.0008; 1.17; 0.55; 0.039; 0.024; 0.022; 0.055; 98.1; - ; and at $800^\circ C$: 1.4; 5.89; 5.27; - ; - ; - ; - ; 87.44; - . Investigation of the activities showed that no losses had occurred. The 5 oe wide signal of paramagnetic resonance (10^{15} paramagnetic particles per g of material) corresponds to the signal of the thermal decomposition products of diphenylol propane. If n is taken as the number of repeating groups in the molecule, then $p = (n + 1)/(2n + 3)$, where p is the molar fraction of diphenylol propane. Then $M = 340 + n \cdot 284$, and $P_0 = (86 \cdot 100)/(340 + n \cdot 284)$, where P_0 is the content (in % by weight) of terminal epoxy groups. Values found for p : from the radioactivity, $p = 0.40$; from the molecular weight, $p = 0.32$; from the content of epoxy groups, $p = 0.36$. At $p = 0.37$ the resin consists chiefly of molecules with $n = 0$ and molecular impurities with $n = 1$. The small fractions of labeled material in the

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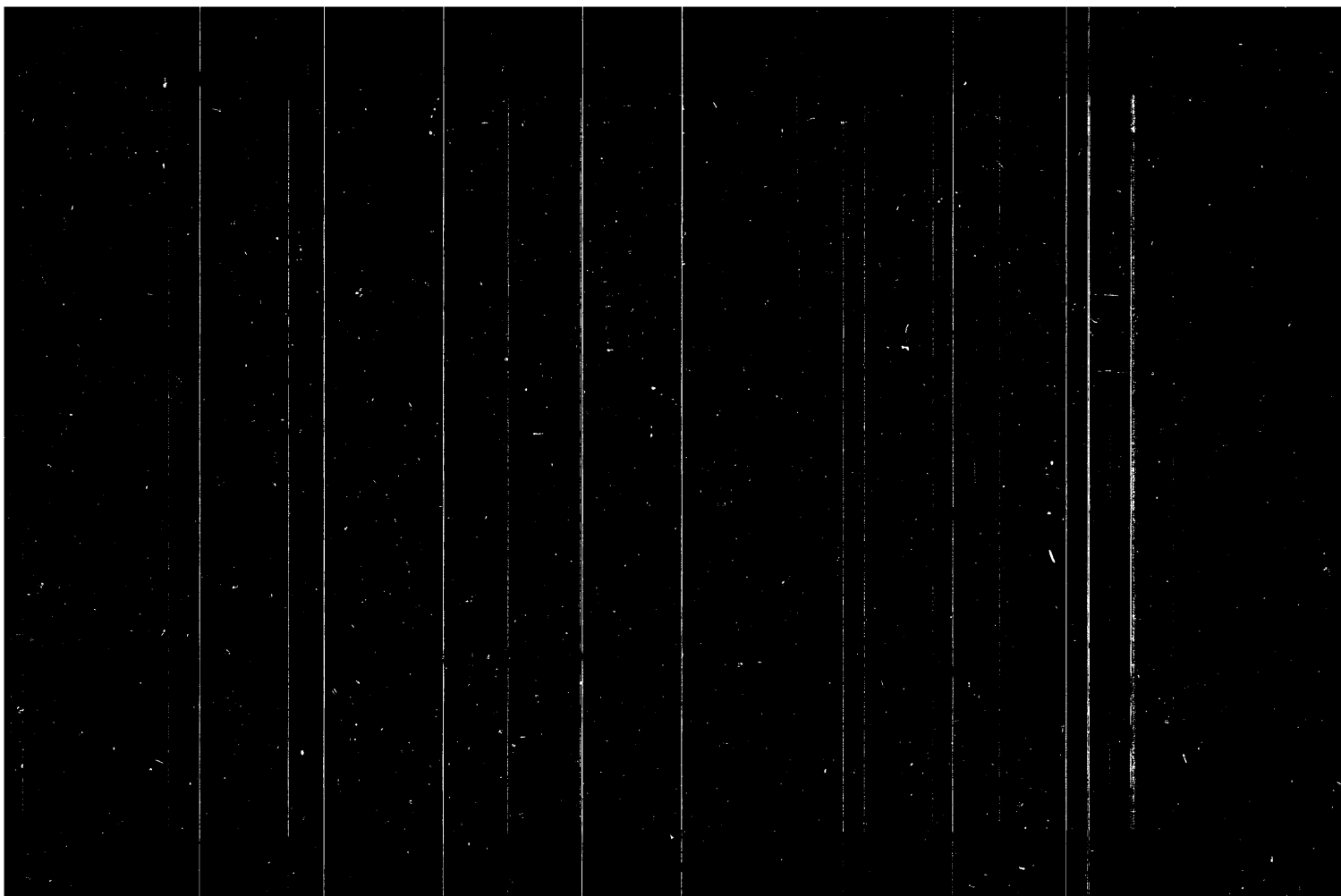
AUTHORS: Moiseyev, V. D., Neyman, M. B., Kovarskaya, B. M., Zhenova, I. Ye., Gur'yanova, V. V.

TITLE: Thermal destruction of condensation resins. Investigation of the thermal destruction of epoxy resins using tagged atoms.

PERIODICAL: Plasticheskiye massy, no. 6, 1962, 11-15

TEXT: The destruction mechanism of epoxy resins was investigated by synthesizing epoxy resin 3A-6 (2D-6), molecular weight 431 (19% epoxy groups), with the central carbon atom tagged, in diphenylolpropane. 1 g resin was heated in a glass ampoule, evacuated to $2 \cdot 10^{-2}$ mm Hg, for 1 hr at 300, 400, and 800°C. The destruction products were passed into (1) an empty, exhausted collecting flask cooled by a mixture of acetone and dry ice, and (2) into a similar flask cooled by liquid N₂ and filled with silica gel. To the first was added distilled water, and to the second a saturated solution of NaCl. The gaseous destruction products in the salt solution were examined by absorption gas chromatography (Al₂O₃), and the following were found to be present: (1) H₂ + CO + CH₄; (2) C₂H₆;
Card 1/5

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D204/D307

5.2470
AUTHORS:

Panchenkov, G. M., Makarov, A. V., D'yachenko, V. Ya., and Moiseyev, V. D.

TITLE:

The viscosity of boron trifluoride

PERIODICAL:

Moscow. Universitet. Vestnik. Seriya II, Khimiya, no. 5, 1962, 11-13

TEXT: The viscosity of BF_3 (η_{BF_3}) was measured to determine

its dependence, as such data are necessary for thermodynamical calculations associated with thermal diffusion columns involving gas. The apparatus (Fig. 1) was made of Mo glass and quartz. For a determination, container 2 (20 l) was filled with CO_2 at atm. pressure, keeping taps 15 - 18 closed; Hg was then pumped into 14 to just cover the top Pt lead (21, 23 and 24 closed). Tap 24 was then opened, and the time of fall of Hg between the upper two leads and 14 was measured (= time required by the CO_2

Card 1/2 2

27576
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B124/B101

Molecular weight, number...

transfer rate, the relation $\bar{M} = \bar{M}_0 \left\{ (g - g_0)/g_0 + 1/[1 + (\bar{M}_0/g_0)(\Delta O_1 - O_1)] \right\}$
(11') (O_1 = high-molecular (mono) olefin) is derived for the molecular weight of the polymer on the assumption that the molar quantities of olefins and paraffins in the volatile degradation products (with the lightest gases being subtracted) are equal to each other. There are 3 references: 1 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: R. Simha, L. A. Wall, P. J. Blatz, J. Polymer Sci. 5, 615, 1950; H. H. G. Jellinek, Degradation of vinyl polymers, New York, 1955. X

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics of the AS USSR)

SUBMITTED: December 8, 1960

Card 4/4

Molecular weight, number...

27576
S/190/61/003/009/011/016
B124/B101

moment t_0). The number of bonds ruptured on depolymerization equals that of monomer molecules formed: $\Delta N_{\text{dep}} = \text{mon}$ (mon = monomer) (1), and $w_{\text{dep}} = (dN_{\text{dep}}/dt) = d\text{mon}/dt$ (1'). The relation: $w_{\text{iso}} = dN_{\text{iso}}/dt = (d/dt)(Ol_1 + R_1H) = - (1/\bar{M}_1)(d/dt)(g + g_{\text{mon}})$ (2') (Ol_1 = light clefin (up to $C_{30} - C_{40}$), \bar{M}_1 = mean molecular weight of the distillate molecule, R_1H = light paraffin (up to $C_{30} - C_{40}$), g = weight of the solid residue at the moment t) holds for the isomerization rate. A general relation: $w_{\text{trans}} = - \{g_0/[M - \bar{M}_0(g - g_0)/g_0]^2\} [(dM/dt) - (\bar{M}_0/g_0)(dg/dt)]$ (6') is derived for the chain transfer rate, where g_0 is the weight of the solid residue at the moment t_0 , \bar{M} the mean molecular weight of the solid residue at the moment t , and \bar{M}_0 the same at the moment t_0 . These three quantities can be determined experimentally. From Eq. (6') and $w_{\text{trans}} = (d/dt)(\Delta Ol - R_1H)$ (10') (where $\Delta Ol = Ol_{\text{iso}} + Ol_{\text{trans}}$) for the chain

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27576
S/190/61/003/009/011/016
B124/B101

Molecular weight, number...

degradation products are distilled off without any change; (3) the light degradation products are formed almost exclusively during isomerization, whereas the monomer forms during depolymerization; (4) the reaction mechanism and, thus, the composition and mean molecular weight of the distillation products remain unchanged during degradation (at constant temperature), as long as the polymer chains are long (mean polymerization degree above $5 \cdot 10^3$); (5) nonconsideration of the polymerization of the olefins contained in the solid residue leads to errors in the determination of the chain transfer rate which are, however, small at low degradation degrees, and (6) on the assumption of long kinetic chains, the following relations are found: $w = w_{\text{dep}} + w_{\text{iso}} + w_{\text{trans}}$; $S = (\Delta N_{\text{dep}} + \Delta N_{\text{iso}} + \Delta N_{\text{trans}})/N_0$; (w_{dep} = depolymerization rate, w_{iso} = isomerization rate, w_{trans} = chain transfer rate, S = thermal degradation degree, ΔN_{dep} = number of bonds ruptured on depolymerization, ΔN_{iso} = number of bonds ruptured on isomerization, ΔN_{trans} = number of bonds ruptured on chain transfer, N_0 = number of bonds per gram of the polymer at the

Card 2/4

158520

27576
S/190/61/003/009/011/016
B124/B101

AUTHORS: Moiseyev, V. D., Neyman, M. B.

TITLE: Molecular weight, number of double bonds, and thermal degradation mechanism of vinyl polymers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 9, 1961, 1383 - 1388

TEXT: A free-radical chain reaction mechanism is assumed for the thermal degradation of vinyl polymers which consists of the initiation, the depolymerization, the isomerization, the intermolecular chain transfer, and the termination steps. This paper deals exclusively with the thermal degradation of linear high polymers with short side chains (prepared with Ziegler-Natta type catalysts) containing at least 5000 to 10000 units in the chain. The light destruction products were frozen under high vacuum, whereby the polymerization of olefins in the distillate is greatly eliminated. For the degradation mechanism of these polymers, the following facts hold: (1) the chief reason for the decrease in molecular weight during thermal degradation is the chain transfer; (2) the light

Card 1/4

Thermal destruction of polymers ...

S/191/61/000/002/002/012
B118/B203

Legend to Fig. 4: Chromato-
gram of gaseous products of
thermal destruction of PE:

- 1) $\text{CO} + \text{H}_2$; 2) $\text{C}_2\text{H}_6 + \text{C}_2\text{H}_4$;
3) C_3H_8 ; 4) C_3H_6 ; 5) C_4H_{10} ;
6) C_4H_8 -1; 7) cis- C_4H_8 ;
8) trans- C_4H_8 ; 9) C_5H_{12}
(various isomers)

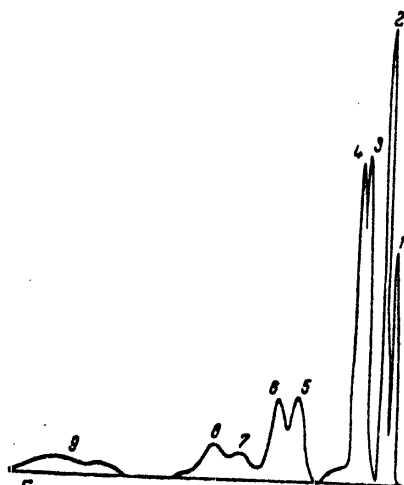


Fig 4

Card 5/5

Thermal destruction of polymers ...

S/191/61/000/002/002/012
B118/B203

There are 4 figures, 3 tables, and 17 references: 7 Soviet-bloc and 10 non-Soviet-bloc. ✓

Legend to Fig. 3: Chromatogram of gaseous products of thermal destruction of PP: 1) $\text{CO} + \text{H}_2$; 2) CH_4 ; 3) C_2H_6 ; 4) C_3H_8 ; 5) C_3H_6 ; 6) $1\text{-C}_4\text{H}_8$; 7) C_5H_{12}



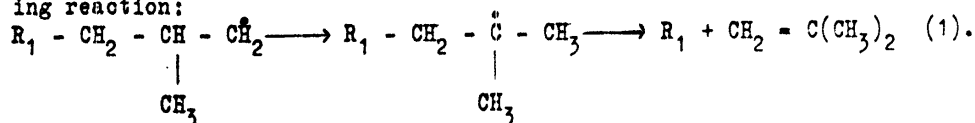
Card 4/5

Fig. 3

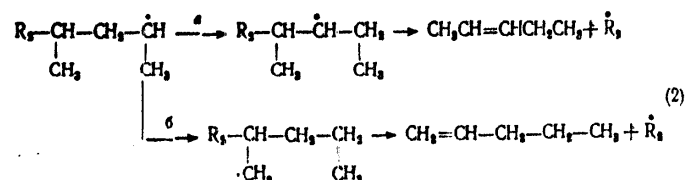
Thermal destruction of polymers ...

S/191/61/000/002/002/012
B118/B203

The butene fraction in the destruction products of PE consists of butene-1, cis-butene-2, and trans-butene-2. On the basis of polarographic data, pentene-2 is present in much smaller amounts than pentene-1. On the basis of the ideas of isomerization of radicals in destruction (Ref. 1), it must be assumed that butenes are formed in the destruction of PP by the following reaction:



Only isobutylene is formed, which is confirmed by the experiment. Pentenes are formed on the basis of the same ideas according to Eq. (2)



Card 3/5

S/191/61/000/002/002/012
B118/B203

Thermal destruction of polymers ...

Berthelot was used. The ozonization of gaseous olefins was performed in an ozone-saturated solvent. The resulting ozonides were reduced to ketones and aldehydes which were determined polarographically (Refs. 9-13). It had to be established whether ozonides were also formed from the solvent; this was accomplished by polarographing the aqueous extracts of the unchanged and of the ozonized solvent. It was found that organic solvents partly passed into water and, in polarography, were reduced or ozonized at the same potentials; the cleavage products of ozonides formed from the solvent were also reduced, namely at the reduction potentials of the aldehydes. Therefore, water was used as solvent. An ozonization method for gaseous olefins was developed which proved to be particularly convenient in chromatographic purification. Ethylene, propylene, isobutylene, butene-1, and butene-2 were ozonized by this method. All aldehydes expected were detected polarographically, though in low yields. Olefins were also ozonized from the destruction products of PP and PE. Figs. 3 and 4 show the chromatograms which exhibit that the butene fraction in the destruction products consists of isobutylene only. The ozonolysis showed that the pentene fraction consisted of pentene-1 only.

S/191/61/000/002/002/012
B118/B203

AUTHORS: Khloplyankina, M.S., Neyman, M.B., Moiseyev, V.D.

TITLE: Thermal destruction of polymers.
II. Comparative studies of gaseous olefins, products of
destruction of polypropylene and polyethylene

PERIODICAL: Plasticheskiye massy, no. 2, 1961, 9 - 12

TEXT: The authors compare the structures of butenes and pentenes (Refs. 1, 2) resulting from the thermal destruction of polypropylene (PP) and polyethylene (PE). A few papers only (Refs. 5, 6) dealt with the ozonization of gaseous olefins which is important for the structural analysis. Besides, the gas quantities of olefins obtained in the experiments of this investigation were very small; the ozonization of such microquantities was only mentioned in one paper (Ref. 6) and not described in detail; also in other papers, the microozonization of olefins was only used for the group $>C=CH_2$. Therefore, it was necessary to elaborate this microozonization for the present investigation. An ozonizer according to

Card 1/5

Estimation of the Concentration of Atomic S/076/60/034/003/026/041XX
Hydrogen and the Chain Length in the Thermal B020/B056
Decomposition of Acetaldehyde

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki (Academy
 of Sciences USSR, Institute of Chemical Physics)

SUBMITTED: December 16, 1958

Estimation of the Concentration of Atomic Hydrogen and the Chain Length in the Thermal Decomposition of Acetaldehyde S/076/60/034/000/026/041XX
B020/B056

cracked at the same temperature and the same pressure, the reaction kinetics being the same as in the presence of 2% ethylene. The results of one experiment are given in Fig. 4. Table 2 shows the rate of the acetaldehyde consumption w at various points of time (obtained from Fig. 4) and the formation rate w' of the marked ethane (from Fig. 3), it being assumed that $w' = w_2$ (concentration of the hydrogen atoms), and that the activity of the ethane² obtained from marked ethylene is equal to that of the latter. The hydrogen atom concentration was calculated as $5.7 \cdot 10^{13} \text{ cm}^3 \text{ sec}^{-1} \text{ mole-eq.}^{-1}$ (Table 2). Determination of the chain length in cracking of the acetaldehyde is given in Fig. 5, where the quantity of the decomposed acetaldehyde is observed as a function of the quantity of the resulting tagged ethene and of the sum $\Delta p_2 = \Delta p_{\text{C}_2\text{H}_6} \cdot 10^{-2} (-\Delta p_{\text{CH}_3\text{CHO}})$. Also Student Ye. D. Fedorov took part in these experiments. There are 5 figures, 2 tables, and 11 references: 3 Soviet, 2 US, 2 British, 3 French, and 1 German. ✓

Card 3/4

Estimation of the Concentration of Atomic Hydrogen and the Chain Length in the Thermal Decomposition of Acetaldehyde S/076/60/034/009/026/041XX
B020/E056

in a fixed glass device, whose scheme is given in Fig. 1. As a carrier gas in the chromatographic column, CO_2 was used. The initial mixture consisted of 3.80 cm^3 methane, 0.75 cm^3 ethane, and 0.40 cm^3 ethylene; from the column, 3.80 cm^3 methane, 0.75 cm^3 ethane, and 0.40 cm^3 ethylene emerged. A mixture of acetaldehyde and tagged ethylene with an activity of 2700 imp./min. mg BaCO_3 was used. The experiments Nos. 3 - 9 were carried out exactly according to the method described, whereas experiments 1 and 2 were carried out with a cooled reaction vessel (these were the blank tests). In the experiments Nos. 3 - 9, from the measured activity α of ethylene 40 imp./min. mg BaCO_3 was calculated, and the difference obtained, $\alpha' = \alpha - 40$, was considered to be the true activity of the ethane, i. e., the activity obtained by the formation of the ethane from tagged ethylene by means of its tagging. The results of the experiments Nos. 1 - 9 are given in Table 1, where also the quantities v of the tagged ethane are given, which were calculated from the isotope rarefaction equation $v = V(\alpha/\alpha')$. The dependence v on the time t and on Δp (fraction of the decomposed acetaldehyde) is given in Fig. 3. Also acetaldehyde without any addition of ethylene was

Card 2/4

S/076/60/034/009/026/041XX
B020/B056

AUTHORS: Moiseyev, V. D. and Neyman, M. B.

TITLE: Estimation of the Concentration of Atomic Hydrogen and the Chain Length in the Thermal Decomposition of Acetaldehyde

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 9, pp. 1960 - 1966

TEXT: M. B. Neyman, N. I. Medvedeva and Ye. S. Torsuyeva (Ref. 1) suggested in 1957 that the concentration of atomic hydrogen in reacting gas mixtures be determined by means of a method based upon using the hydrogenation of C¹⁴-tagged ethylene. This method may be used whenever no elementary reactions of the hydrogenation of ethylene takes place by means of molecules or radicals other than [H]. The authors of the abovementioned paper in this way determined the concentration of atomic hydrogen at the decomposition temperature of propane. In the present work the said method was applied to determine the concentration of atomic hydrogen at various instants of the reaction of the thermal decomposition of acetaldehyde, it being assumed that no disturbing side reactions occur. The experiments were carried out

Card 1/4

83413

On the Origin of Pyrolysis Products of
Phenol Formaldehyde Resin

S/191/60/000/006/005/015
B004/B054

After three hours' duration of the experiment, no gas was formed any longer. The composition of the resulting gases was analyzed chromatographically, the gas components were separated chromatographically by means of activated coal, burned, the resulting CO₂ was absorbed in barium hydroxide solution, and the activity was measured by the end window counter of a B-22 (B-2) apparatus. The coke formed was burned in an oxygen flow, and the CO₂ was also tested for its activity. Table 1 shows the specific activity of gases and coke. Table 2 indicates the activities of the resin and its pyrolysis products. Hence it follows that in the thermal destruction of the resin the greater part of the methylene bridges remains in the coke, and is not removed in the form of gas. The carbonaceous gases do not only develop from the methylene bridges but also by the rupture of part of the aromatic rings. There are 2 tables and 14 references: 7 Soviet, 1 US, 2 British, and 4 Japanese.

[Annotation: This may be an indication of work connected with nosecone₂₀ research, vanes and valves, and ablation.]

6 1

Card 2/2

17.4410 also 2308
17.4312
5.3812

83413

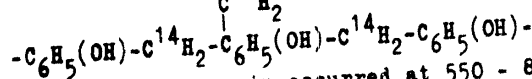
S/191/60/000/006/005/015
B004/B054

AUTHORS: Moliseyev, V. D., Neyman, M. B., Raspopova, Ye. N.

TITLE: On the Origin of Pyrolysis Products of Phenol Formaldehyde Resin

PERIODICAL: Plasticheskiye massy, 1960, No. 6, pp. 11 - 13

TEXT: The authors discuss the possibility of formation of graphitic structures by pyrolysis of polymers containing aromatic rings, which may lead to the production of substances resistant to high temperatures. To clarify this problem they synthesized a phenol formaldehyde resin with C^{14} -tagged formaldehyde (Refs. 9-12), the structure of which is specified: $-C_6H_5(OH)-C^{14}H_2-C_6H_5(OH)-C^{14}H_2-C_6H_5(OH)-$



Thermal destruction of the resin occurred at 550 - 800°C and 10^{-2} torr.

Card 1/2

MOISEVICH, V.D.; MEYMAN, M.B.; KRYUKOVA, A.I.

Thermal degradation of polypropylene. Vysokom.sped. 1
no.10:1552-1557 0 '59. (MIRA 13:3)

1. Institut khimicheskoy fiziki AN SSSR.
(Propene)

NEYMAN, M.B.; GOLUBENKOVA, L.I.; KOVANSKAYA, B.M.; STRISHKOVA, A.S.;
LEVANTOVSKAYA, I.I.; AKUTIN, M.S.; MOISEYEV, V.D.

Thermal degradation of condensation resins. Part 1: Thermal
degradation of epoxide resins. Vysokom.socd. 1 no.10:
1531-1537 0 '59. (MIRA 13:3)

1. Nauchno-issledovatel'skiy institut plastmass, Moskva.
(Resins, Synthetic)

SOV/20-123-2-23/50

Ways of the Formation of Propylene and Ethylene in Isobutylene Cracking

Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of
Chemical Physics, AS USSR)

SUBMITTED: July 28, 1958

Card 4/4

SOV/20-123-2-23/50

Ways of the Formation of Propylene and Ethylene in Isobutylene Cracking

beginning of the reactions this value w_1 is not equal to zero; it increases during the first 10-12 minutes, i.e. to about 20% isobutylene transformation. This w_1 increase tends to show that a considerable propylene amount in isobutylene cracking is not formed from isobutylene but from any intermediate products of the cracking, obviously from liquids. As may be seen from Figure 2, the formation velocity of propylene passes a maximum within the range of 10-14 minutes and then decreases. The authors consider it to be premature to draw any conclusions. The ethylene activity determined in some experiments besides the specific activity of propylene is given in Figure 3. As this activity is much lower than that of propylene, this tends to show that only part of the ethylene is formed from propylene. Also ethylene can be formed either from isobutylene directly or from liquids. Based on the experimental results obtained it is not possible to make a decision as to the way of formation prevailing. The fact that propylene is formed from liquids tends to show the possibility of the ethylene formation from the latter. There are 3 figures and 4 references, 2 of which are

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SOV/20-123-2-23/50

Ways of the Formation of Propylene and Ethylene in Isobutylene Cracking

concerning the type and amount of the gases escaping from the liquids or in their formation is not investigated at all. Propylene is one of the main products of isobutylene cracking. If it were formed from isobutylene only, its formation velocity would decrease with the exhaustion of the isobutylene. If propylene is, however, formed from the liquid or from any other intermediate product of low stability (not from radicals), its formation velocity in the beginning of the reaction must be equal to zero, and then increase according to the law of successive reactions. If both ways of the formation of propylene are correct the two pictures must agree. This was the case in the present experiments. The change of the formation velocity of propylene was investigated by the isotopic kinetic method (Ref 3). Ye. D. Fedorov took part in the synthesis of the marked propylene (with C^{14} on the hydroxyl group). This propylene (15 torr) was subjected together with isobutylene (285 torr) to a cracking in vacuum at 542° . The course of the specific activity α and of the C_3H_6 concentrations are given in figure 1.

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Figure 2 gives the formation velocity of propylene w_1 . In the

SOV/20-123-2-23/50

5(1.3)
AUTHORS:

Moiseyev, V. D., Lyadova, Yu. I., Vedeneyev, V. I., Neyman, M. B., Voyevodskiy, V. V., Corresponding Member, AS USSR

TITLE:

Ways of the Formation of Propylene and Ethylene in Isobutylene Cracking (Puti obrazovaniya propilena i etilena pri krekinge izobutilena)

PERIODICAL:

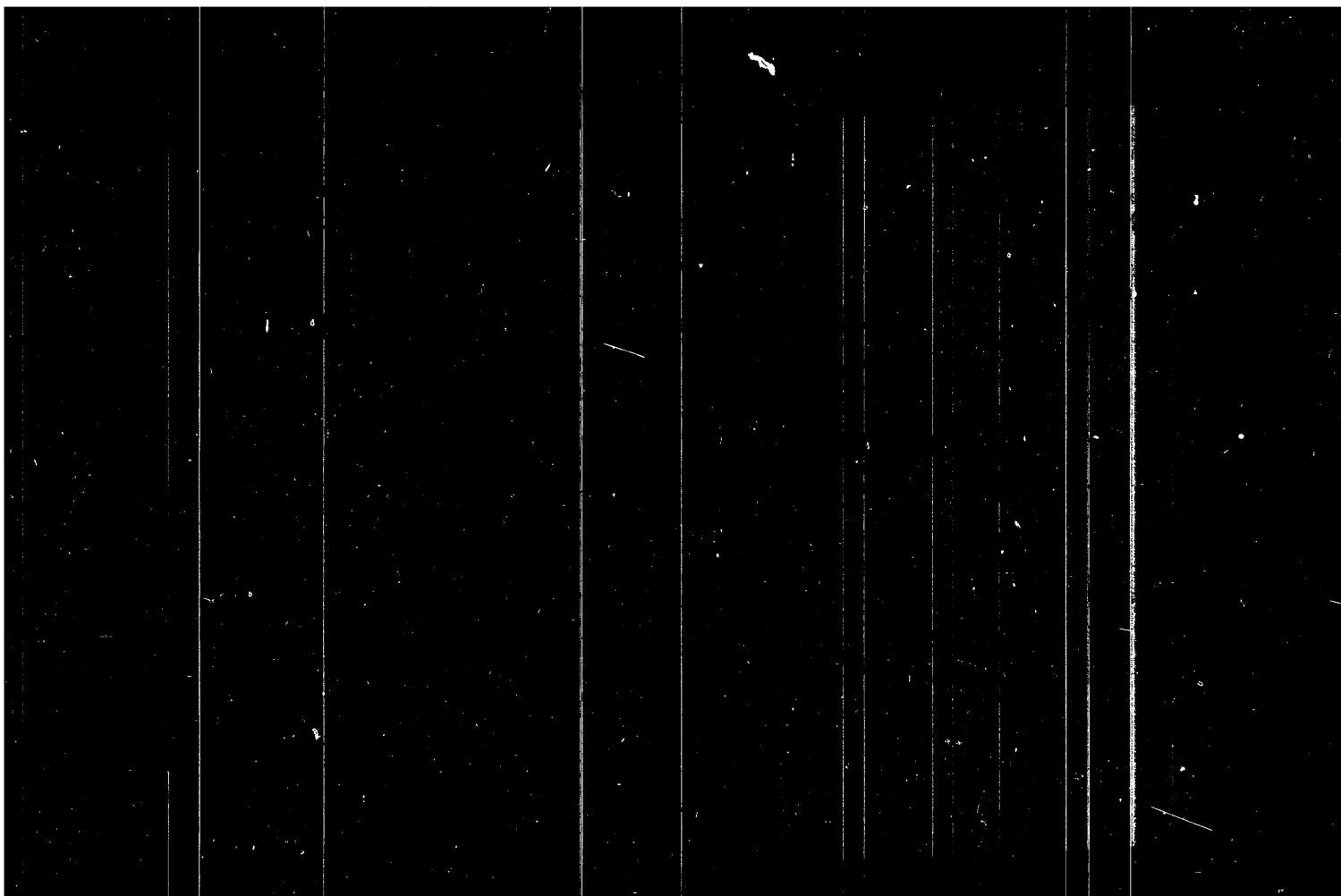
Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 2, pp 292-294 (USSR)

ABSTRACT:

As is known, up to 50% of the initial substance in thermal isobutylene decomposition are transformed into liquids (olefins, aromatic compounds). Apparently the polymerization of the initial olefin forms the first stage of the liquid formation, with dimeric and trimeric olefin being formed. The latter themselves are capable of being transformed in various ways with the final result being liquid cracking products. The ratio between carbon and hydrogen in these products is about 1 (Ref 2), whereas it is 2 in isobutylene. From this may be supposed that hydrogen and methane are separated in the formation of the liquids; in principle, also heavier cracking gases with 2 and 3 carbon atoms each in the molecule can be formed. The problem

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MOISEYEV, V.D.

B-7

USSR/Isotopes.

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18415

Author : G.M. Panchenkov, V.D. Moiseyev.
Title : Concentration of isotopes C^{13} and O^{18} in Carbon Dioxide by Thermo-diffusion Method.

Orig Pub : Zh. fiz. Khimii, 1956, 30, No 7, 1662-1667

Moscow State Univ in M.V. Lomonosov
Abstract : The concentration of isotopes C^{13} and O^{18} in a molybdenum glass tube by the thermodiffusion method was studied. The inside radius of the tube was 0.40 cm, the top and the bottom of the tube were connected with receivers, the capacity of which was 2.5 l and 60 ml respectively, and a Pt filament (287 cm long, radius 0.015 cm) was stretched along the tube axis. Co prepared by gradual addition of HCOOH to concentrated H_2SO_4 and purified by $KMnO_4$, KOH and concentrated H_2SO_4 was fed into the tube previously evacuated to 10^{-2} - 10^{-3} mm of mercury column; the Pt filament was heated to 730°; samples

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USSR/Isotopes.

B-7

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18421

and q decreased with time. In order to eliminate the influence of the variable amount of admixtures in samples on the analysis results of BF_3 samples, it was proposed to measure the intensity of peaks of B^+ which were not overlapped by contamination peaks; the harmful influence of adsorption was decreased by continual heating of the feeding system to 200° , by heating the high vacuum system 2 to 3 times daily, and by a periodical sucking of air through the heated and evacuated feeding system at 10^{-5} mm of mercury column.

Card 2/2

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V.D. MOISEYEV

USSR/Isotopes.

B-7

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18421

Author : G.M. Panchenkov, V.D. Moiseyev.

Title : Mass Spectrometric Isotope Analysis of Boron Fluoride.

Orig Pub : Zh. fiz. khimii, 1956, 30, No 5, 1118-1125

Moiseyev, V.D. in Zh. fiz. khimii

Abstract : The method of measuring small differences in the isotope composition of BF_3 with an accuracy of above 0.5% is described. It was established for gas amounts of 5 to 10 cub.cm at 760 mm of mercury column that the ratio $q = \text{B}^{11} / \text{B}^{10}$ in a standard sample of BF_3 was 4.44 ± 0.05 and did not change with time, provided the pressure in the ampoule was > 1 at; at pressures < 1 at, a strong dependence of q on time was detected, which was explained by the fact that B^{11}F_3 was desorbed easier than B^{10}F_3 after a strong gas adsorption on the walls of the feeding and the high vacuum systems of the mass spectrometer; when pumped out, the gas became enriched with B^{10}

Card 1/2

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